

# The Iron Age

A Review of the Hardware and Metal Trades.

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## The International Bridge at Buffalo.

We illustrate this week a very important though not very grand looking public work, the International Bridge across the Niagara River at Buffalo, which may be briefly described as a superstructure of iron, known as Pratt's truss. The trusses consist of four main lines—that from pier to pier, the lower chord, as it is called; that parallel with it, but at considerable height above it, and known as the main chord; and counter supports at either end, on which the upper chord rests. The upper chord and end counters are tubular, put together in five pieces, with flanges. The lower chord consists of rods

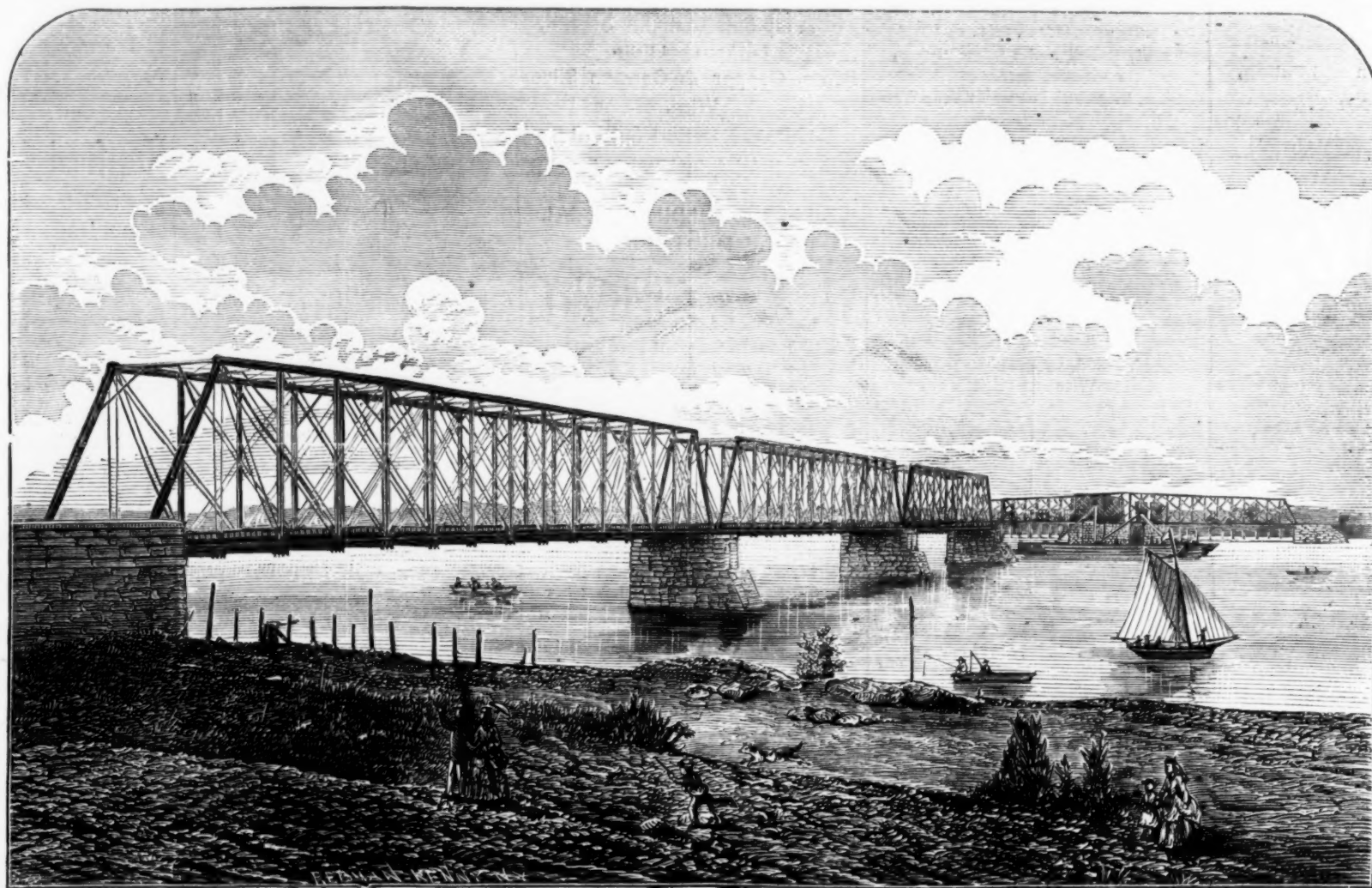
Harbor and the Erie Canal, spanned by a draw-bridge 218 feet long, and giving 90 feet clear on each side of the center pier, and a truss 219 feet over the canal, resting on a solid abutment on a level with the high bank, from which already radiate a multitude of tracks of the American companies which have secured rights of way and the privilege to use the bridge. The total length is, then, a trifle over 3607 feet. The construction has necessitated the invention of some novel engineering appliances to overcome the difficulties, as, for instance, the method of putting the spans in place by means of a dry dock, sunk from under the span. In constructing the bridge over the Menai Straits, George

## Spiegel Iron Ore.

Hitherto the manufacturers of cast steel by the Bessemer process have been compelled to depend for their supplies of spiegeleisen almost entirely upon the spathose iron ores obtained in the district of Siegen, in Westphalia, and as the supplies have been somewhat limited, while the demands for spiegeleisen have been of late rapidly and extensively increasing, new sources of supply have been much sought after. Cornwall, Weardale, in Durham, the Brendon Hills, in Somersetshire, and one or two other parts of England, have yielded greater or less supplies of spathic ironstone, that from

Messrs. Hawkins & Bush, of London. The workings commenced by that firm contain three lodes of excellent red ore. They are called the Florence mines, and are being connected with the railway at South Molton station, by means of a tramway at present in course of construction. On the west of the Bampfylde Mining Company's property there is the Poltimore Sett, which embraces about 2500 acres, and has been secured by Messrs. Granger Brothers, of Glasgow. Lodes of red hematite, containing a large quantity of peroxide of manganese, have also been found on the Poltimore Sett, and workings commenced. Still further to the west, on the farm of Wal-

of carbide, so as to be of use in the carbonizing process in the Bessemer converter. We are only aware of one published analysis of a spathic iron ore containing a greater proportion of protoxide of manganese than the No. 1 Walscott, just given. It is the ore of Ehrenfridersdorf, in Saxony, the quantity of that mineral compound being 25.31 per cent., while a picked sample of the famous spathose ironstone of Musen, in the Siegen district, only yielded 17.87 per cent. of the same compound. The Walscott spathic iron ore, beside being rich in the essential constituents which go to make up a suitable mineral for use in producing spiegel iron, is also very pure, so far as sulphur and



THE INTERNATIONAL BRIDGE AT BUFFALO.

which tie the counters and verticals and resist the tendency of the upper chords to thrust the counters apart. The upper chord is that on which the roadway is hung. Transverse girders are suspended therefrom. The girders are bolted to the lower chord, and connected with the upper by an iron vertical principal. The uniform load which would necessarily fall on this vertical principal is distributed laterally by means of counter braces and rods, until it is thrown finally on the piers. The bridge has the strength of a tubular one, without its weight and other objections. Vertical and counter pieces form the sides; the tops of the vertical principals, united horizontally, strengthened diagonally, and supported by angle ties, form the roof; and the roadway constitutes the floor. The draws are turned by steam, and have various improvements adapted to the special requirements of the case. The spans are placed on the piers by a novel method. They are built upon a frame-work over a number of pontoons which act in the manner of a dry-dock. The pontoons are carefully dropped between the piers, and when in position water is let into them and the iron truss is settled into its exact place on the piers. Three summers have been consumed in the construction of this work, which the contractor, Mr. Gzowski, declares will be completed this fall. The bridge over the river proper is slightly over 1907 feet in length, divided into seven spans of from 181 to 248 feet, and a double draw of 262 feet, turning on a center pier, giving ample room for the passage of any lake craft on either side. Starting from the Canada side, there are six spans to the draw. The deepest water is beneath the fifth span, being nearly 40 feet. It is smooth rock to the Canada shore, but clay and boulders to Squaw Island, on the American side. This island is low and marshy, formed by the drift from the lake, and is crossed by a trestle-work upward of 1300 feet long. The trestle-work will be filled in with Canadian earth as soon as practicable after the bridge is finished. Crossing the trestle, we come to Black Rock

Stephenson made use of the tides to raise the tubes. Mr. Gzowski's plan is directly the opposite of that. The difficulties in building the piers for the great Montreal bridge were considered very great, but the water was nowhere more than fourteen feet deep, while here most of the piers rest on a bottom from thirty to forty feet below the surface. When, instead of a solid rock bottom, the gravel, boulders, and clay were met, it appeared as though the project would have to be abandoned. It seemed impossible to pierce through to the solid rock, but a plan was devised for doing it. The caissons were placed within coffer dams and sunk in the exact spot where the pier was to stand. A peculiar grappling dredge was set to work and picked out the boulders and other stuff. The caisson, armed with a sharp iron shoe, gradually settled down to the hard rock. Then the concrete was thrown in and the masonry built upon that. Some curious things were dredged out from the bottom, such as an old boarding pistol, an ancient musket with bayonet fixed, the woodwork petrified; part of a dock, and a pine stump with the old axe marks on it. The bridge company is composed mainly of prominent railway men in Canada. C. J. Bridges is the president. It is not controlled by any one road, and the pronounced object is to benefit the Canadian roads by giving them an equal outlet to the States. So far the utmost fairness has been shown to lines on both sides. The New York Central, the Erie, and other local roads have secured approaches to the bridge. When finished the bridge will be of the greatest railway value. It is not an imposing work, nor will the extraordinary difficulties attending its construction show. But, nevertheless, it will be known to engineers as a remarkable work, requiring great skill, greater ingenuity, and wonderful perseverance to accomplish it.

The sum of \$70,000 has been pledged for the establishment of a knitting factory at Battle Creek, Mich.

the Brendon Hills being worked and used during the last few years for the manufacture of spiegeleisen by the Ebbw Vale Iron and Steel Company. The amount of spathic ironstone worked by that company is understood to be about 50 tons per day, and the mineral is retained for the exclusive use of the company.

In a district lying about 20 miles to the west of the mines worked in the Brendon Hills by the Ebbw Vale Company, and within a few miles of the town of South Molton, there has recently been discovered what promises to become a very large deposit of this variety of ironstone, and of very marked richness and purity. The district in question has long been known to contain lead, copper, manganese, and iron ores, some of which have been worked in former years to a greater or less extent; but it is only quite recently that very special attention has been given to the iron ores in the district referred to. Hitherto the district has lain outside the region of railways, and therefore any mineral wealth contained in it could only be developed to a very limited extent; now, however, there is in course of construction, and nearly ready for opening, a railway about 40 miles in length, running right through the district, almost due west, and joining Taunton, on the Bristol and Exeter Railway, with Barnstaple on the sea coast. The line in question is the Devon and Somerset Railway. It runs parallel to the new mining district, which lies at a distance of from three to five miles from it, and near the western boundary of Exmoor, several hundred feet above the sea level.

At least three important mineral concessions have been obtained, all of which are upon the estate of Lord Poltimore. One of them is secured by the Bampfylde Mining Company, by whom copper ore has been wrought for a number of years. They are now opening up lodes of red hematite, which is alike rich in peroxide of iron and manganese. To the east of, and immediately joining, the Bampfylde mines, there is a very large tract of ground, extending to about 5000 acres, which has been leased by

seott, and on the same property, and nearly in a line with those lodes, Messrs. Granger have been successful in discovering white ore, or spathic carbonate of iron. When we consider this discovery in connection with the limited supply of spiegel iron, it becomes one of very great industrial importance. The westernmost portion of the Poltimore Sett has now been to a great extent "proved," and its appearance seems to indicate the existence of immense deposits of spathose ore.

The ore crops out at Walscott on the surface of a rising ground in such a manner as to give indications that the lode was at one time worked for manganese. When the workings were commenced recently by the lessees, the lode was only a couple of feet in width, but it gradually increased in extent, and very soon attained a width of about 20 ft., and operations are now in progress for working the ore by an "open-cast." Openings have been made on the rising ground to the east which show that the lode is continuous for the distance of at least a quarter of a mile, and it is most probable, if not even quite certain, that the same lode may be traced more or less continuously all the way from the Ebbw Vale Company's mines in the Brendon Hills, which, as already mentioned, is a distance of some 20 miles. Large quantities of the ore are being turned out, so as to be ready for transit as soon as the Devon and Somerset Railway is open for traffic.

The richness of this Walscott spathose iron ore may be judged of by reference to the following analyses:

No. 1.	
Protoxide of iron.....	29.02
Protoxide of manganese.....	43.37
Carbonic acid.....	33.85
No. 2.	
Carbonate of iron.....	55
Carbonate of manganese.....	34

As is well known, an important element in valuing a spathose iron ore for the production of spiegeleisen is the percentage of carbonate or protoxide of iron which it contains, as it is desired that the resulting spiegel iron should contain a large quantity of manganese in the form

phosphorus are concerned. In respect of its silicious reinstuff there is nothing to complain of, more especially in the ore obtained at some depth in the lode, the silica being only about 3 or 4 per cent.

It will at once be seen that large deposits of spathose ore of such richness and purity cannot fail to exert an important influence on the manufacture of Bessemer steel in the immediate future. It is understood that the maximum productive power of the Musen mines is about 30,000 tons per annum. But Bessemer steel works have, during late years, increased greatly, both in number and extent, and the consequence is that the price of spiegeleisen has increased with the demand for it, so greatly, indeed, that within the last 10 years it has advanced from about £6 per ton to from £15 to £16 per ton, delivered free on board at Rotterdam, and were the Bessemer trade to depend exclusively upon the spiegel iron from the Siegen district, it is questionable if there would be a sufficient supply for those Bessemer furnaces that are in operation, together with the very large number which are in process of erection in England and America. Fortunately, however, the manufacturers of Bessemer steel will soon be more favorably situated in this respect, and, therefore, we can scarcely expect that there will be any further material advance in the price of this agent of prime importance in a great metallurgical industry.

Owing to the natural conformation of the mineral district now in process of being opened up, the construction of tramways from the mines to the station at South Molton will be easily accomplished, as there is a gradual fall from the whole way. The minerals will be trucked at South Molton, and sent either west or east. It is not very probable that Barnstaple will be made the shipping port for the new mining district, as the harbor is nearly a mile from the station, and therefore the probability is that the Bristol and Exeter Railway Company, by whom the new line of railway is to be worked, will offer special rates to Burnham, near Bridgwater. That port lies opposite to, and is only about 14 miles from Cardiff, where there is an excellent harbor, and where facilities are obtainable for shipping to all parts of the world.

There has been some talk about erecting blast furnaces in North Devon, but we believe that nothing has yet been decided upon in reference to the matter.—Engineering.



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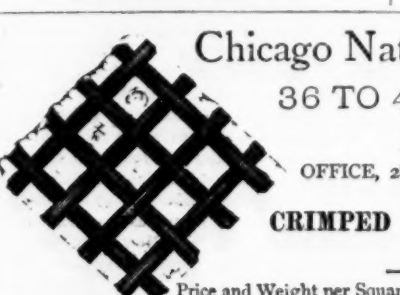
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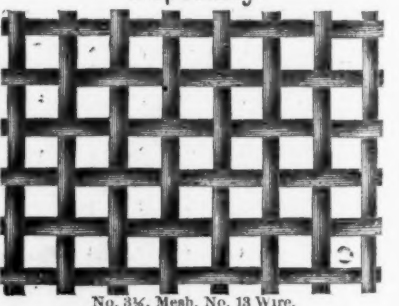
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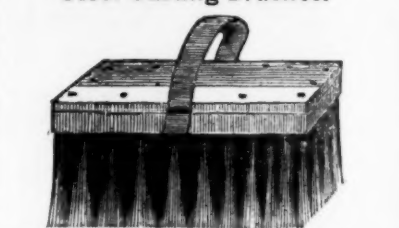
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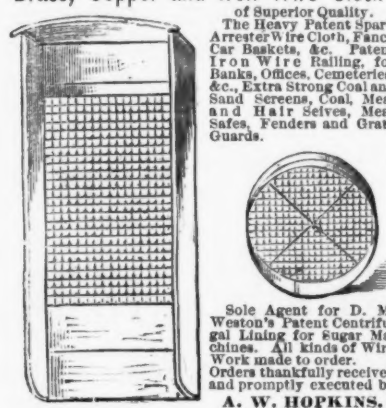
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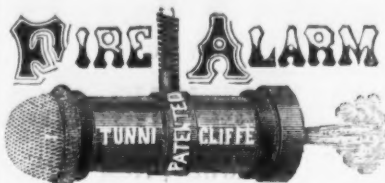
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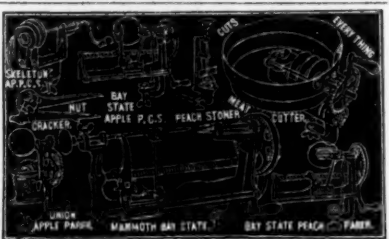
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Fire-Brick, Blast Furnace Blocks

Of all shapes and sizes, Fire Clay, &c.

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**BLACK LEAD**

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For Steel, Brass, Nickel, Copper, Bronze, &c.

Equal to any in the market, and all guaranteed.

Keep a full stock of all sizes on hand, and  
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## Watson Fire Brick Manufactory,

ESTABLISHED 1836.

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## FIRE BRICK.

For Rolling Mills, Blast Furnaces, Foundries,  
Gas Works, Lime Kilns, Tanneries, &c. or  
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**FIRE CLAYS, FIRE SAND, AND KAOLIN FOR SALE.**

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Manufacturers of FIRE BRICK of every shape  
for Gas Works, Tanneries, Lime Kilns, Rolling Mills,  
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by cargo or barrel. Orders filled on short notice.

## Brick Presses,

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For grinding Clay for Red or Fire Brick, and all  
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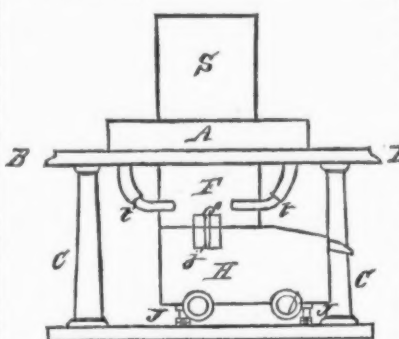
**76 RADE STREET, N. Y.**

## New Patents.

We take from the records of the patent office  
at Washington the following specifications of  
certain patents lately issued, which will be found  
interesting:

**IMPROVEMENT IN BLAST FURNACES.**  
Specification forming part of Letters Patent  
No. 139,489, dated June 3, 1873, issued to John  
V. Woodhouse, of Mine La Motte, Missouri.

Ordinary blast furnaces have their hearth or  
bottom forming part of the furnace; and in  
smelting copper, silver, nickel, and other metals,  
the lining of the furnace "burns out," and the  
furnace proper becomes oxidized and is rendered  
worthless. Frequently the furnace is "chilled"  
by its tuyeres becoming choked or clogged by  
the action of the "slag;" and similarly the bot-  
tom or hearth is rendered inoperative from the  
slag, and great difficulties are experienced in  
removing the slag and otherwise readapting the  
furnace. Moreover, great expense and time  
and labor are incurred in laying a new hearth  
or supplanting the old hearth or bottom when  
the same becomes useless. This invention has  
for its object the avoidance of the difficulties  
aforesaid by readily enabling smelters to get at  
the hearth, bottom, or floor inside of a cupola  
or stack furnace.



IMPROVEMENT IN BLAST FURNACES—Fig. 1.

The nature of the invention, therefore, con-  
sists, first, in the formation of a detachable  
hearth or bottom; secondly, in forming the  
furnace proper or cupola or stack independent  
of the hearth; thirdly, in the combination of  
hearth, stack or cupola, and furnace; and last-  
ly, in certain detail constructions of parts—all  
of which will now more fully appear.

Figure 1 is a side elevation; Fig. 2 is a  
perspective view of detachable hearth; Fig.  
3 is an enlarged detail section, showing manner  
of connecting joint of furnace with its stack.  
The drawing illustrates a "stack" furnace sup-  
ported on columns, with air-chamber; tuyere-  
pipes as ordinary. Therefore, C are the columns;  
B, the bed on columns to support the stack fur-  
nace; A, the air chamber on bed B to supply  
the blast. The stack and furnace I form in two  
parts or sections, so that the furnace can be re-  
moved from its stack; hence S is the stack; F,  
the furnace in which the ore is treated. The  
bed, B, I provide with an annular seat, b, Fig. 3,  
on which the stack rests. The furnace F has  
its top so formed as to project and fit within  
the annular opening of the bed B, and abut  
against the bottom of the stack S when joined  
(see Fig. 3). The required joint for blast pur-  
poses is completed by placing fire-clay or other  
suitable lining material I between the joint of  
F and B (see Fig. 3), the object of thus forming  
the furnace F detachable from the stack S be-

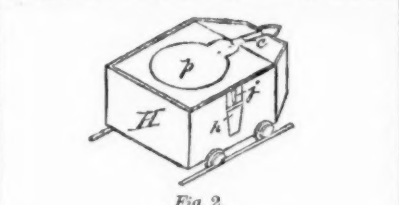


Fig. 2.

ing to get at the parts when "chilling" occurs  
by the tuyeres being clogged, and to readily  
enable the furnace to be removed when the  
same becomes oxidized or is burnt out. I are  
the tuyere pipes connecting from air-chamber  
A to furnace F to furnish blast to same. H,  
Figs. 1 and 2, is a detachable hearth, bottom,  
or floor, consisting of a sheet iron carriage or  
case filled with earth, brick, lining, and the  
like. p is the basin or pot of hearth H to re-  
ceive the reduced metal, which flows out of the  
usual tap-hole a at the side of the hearth. c,  
top of the hearth, is a channel for the discharge  
of the slag or extraneous matter. The hearth  
H is supported on wheels on a tram-way, Figs.  
1 and 2, so as to be readily removed and re-  
placed as occasion requires. The furnace F is  
placed or first supported on the hearth-carriage  
over its basin, and coupled by side pins f of fur-  
nace engaging the journals j attached to sides  
of hearth, Figs. 1 and 2. The hearth H with  
furnace F on top being brought in line under  
the stack, the required lift-movement for the  
parts to make their connection or joint is ac-

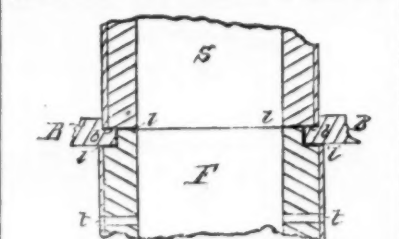


Fig. 3.

complished by means of ordinary jack-screws  
J, (see Fig. 1). The jack-screws J are arranged  
to properly engage the bottom or under side of  
hearth H, and this (with furnace on top) is  
raised to the required height until the joint of  
furnace F is completed with its stack S, as in-  
dicated in Figs. 1 and 3. Thus the stack and  
furnace are continuously united, the connection  
of tuyere-pipes made, the furnace and hearth

properly supported, and the parts adapted for  
the process of smelting, which is done in the  
ordinary way.

As apparent, the hearth H, in case of neces-  
sity, can be lowered alone by supporting the  
furnace F in any proper manner, inserting bars  
through its tuyere-holes, and the hearth can be  
repaired, re-established, or otherwise rendered  
operative for the purposes intended.

In case the furnace becomes chilled or ox-  
idized or rendered inoperative, it is lowered  
with hearth and the readaptation made.

**Claim—1.** A detachable hearth or bottom or  
floor,

2. The cupola or stack independent of the  
hearth.

3. The furnaces in which the reduction takes  
place formed independent or detachable from  
its stack or cupola.

4. The combination of a detachable hearth,  
H, furnace F, and stack S or cupola.

## IMPROVEMENT IN COMPOUNDS FOR TREATING

IRON, STEEL, &c.

Specification forming part of Letters Patent  
No. 139,335, dated May 27, 1873, issued to  
William A. Skinner and John E. Goodson, of  
Callao, Missouri.

This invention consists of the following in-  
gredients, in about the proportions given, viz:  
Pulverized borax, two parts; muriate ammonia,  
one part and one-half; nitrate of potash, one  
part; prussiate of iron, one-quarter of one part.  
These are to be pulverized and mixed thorough-  
ly together, when they will be ready for use.

In using this compound it is not necessary, as  
in the case with all others with which we are  
acquainted, to apply it directly to the metal to  
be operated upon, but only that it be placed in  
the fire in which the metal is heated. It desul-  
phurizes stone-coal, and iron or steel heated in  
a fire containing it is freed from scales and cor-  
rosions, is refined, toughened, and softened,  
and the coarsest grades of metals, when heated  
by a fire containing the composition, are so im-  
proved in texture and quality as to be equal to  
the best. Used in a smelting furnace it refines  
the metal, and in a casting blast also renders  
the castings more smooth and tough than usual.  
Cast-steel heated in a fire containing the com-  
pound can be worked and welded without any  
external application, will bear a much higher  
heat without injury than it would without it,  
and will bear hammering at a heat that it could  
not possibly bear in ordinary fires.

In an ordinary blacksmith's forge it is used  
as follows: While the fire is in full blast draw  
back the burning coals and place a package con-  
taining about two ounces of the compound im-  
mediately below and in front of the nozzle of  
the bellows-pipe; then throw the fire back im-  
mediately and proceed to work the fire, as usual.  
Cast steel heated to a borax heat and hammer-  
ed, as usual, will readily weld without the ne-  
cessity of the direct application of borax or any  
other chemical compound or ingredient.

This compound sprinkled or dusted over stone  
coal, when used in stoves, furnaces, blast, or  
any and all other places where stone coal is  
used for heating for any purpose whatever, will,  
by desulphurizing and cleansing the coal, protect  
the stoves, furnace grates, &c., thereby increas-  
ing their durability, and protecting them from  
the effects of burning coal.

1. A compound, substantially as herein de-  
scribed, for use in the fire, but not in direct con-  
tact with the metal operated upon.

2. The combination of the ingredients de-  
scribed, or their equivalents, in substantially the  
proportions specified.

**A Mammoth Boiler.**—The *Lumberman's  
Gazette*, of Bay City, Michigan, says: One of  
the largest boilers in the country has been re-  
cently put into Sage & Co.'s mill. Its dimen-  
sions are as follows: Length of outer shell,  
30 feet; breadth, 11 feet; depth from top to  
bottom, 15 feet; inner shell, 18 feet in length,  
9 feet in width, 11 feet in depth, the inner shell  
forming the fire box, which is supplied with  
heavy grates. A draught hole is formed  
through both shells in the front end below the  
grates 9 feet wide by 2 feet in depth. A cor-  
responding outlet is formed through the rear end  
near the crown sheet for the escape of smoke.  
There are two openings in the top to receive  
fuel. There is a foot of water space on the  
sides, ends and bottom, with four feet space for  
water and steam above the crown sheet. The  
sides, ends and bottom shells are stayed to-  
gether with screw bolts seven-eighths of an  
inch in diameter screwed through the plates  
and riveted every six inches, and the crown  
sheets stayed every foot with heavy double stay  
braces. The outer shell is made of three-  
eighths Lake Superior iron from the Wyandotte  
rolling mills. The inner shell is five-sixteenths  
iron of the same quality. Total weight of boiler  
is a trifle less than thirty tons. It was con-  
structed for the double purpose of consuming  
the surplus offal and generating steam for the  
new salt block. After a week's trial it proves  
to be a complete success as a consumer of offal,  
and generates considerable steam. This huge  
boiler was built by McKinnon, Wildman & Co.,  
of Bay City, under the immediate supervision  
of Mr. Robert Wildman, and was tested with  
hot water pressure to sixty-two pounds to the  
square inch, under the direction of Mr. Wild-  
man, and stood the strain without the least in-  
dication of giving away. The workmanship  
throughout is first-class. Its novel construc-  
tion and adaptability for the objects for which  
it was made makes it a great curiosity to those  
who never saw a like furnace. The smoke is  
conveyed through a brick flue 30 feet long from  
the boiler to an iron smoke stack 105 feet high  
and 8 feet in diameter, which gives it a brisk  
draught.

A stock company has been formed at Salt  
Lake City, with a capital of one million dol-  
lars, for the purpose of reducing Utah ores with  
the oxyhydrogen furnace, the invention of Levi  
Stevens.



Iron. NEW YORK.	Iron. NEW YORK.	Iron. NEW YORK.	Iron. NEW YORK.	Iron. PITTSBURGH.
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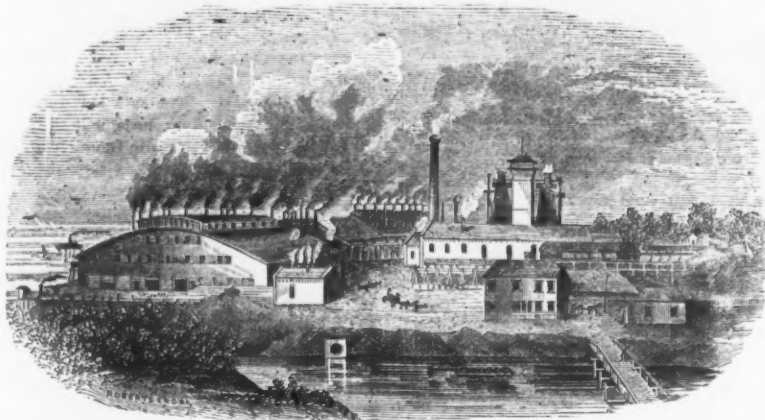
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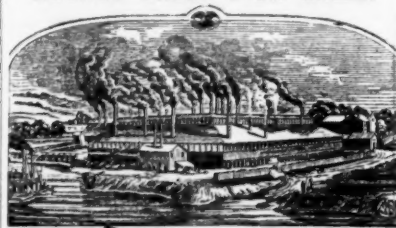
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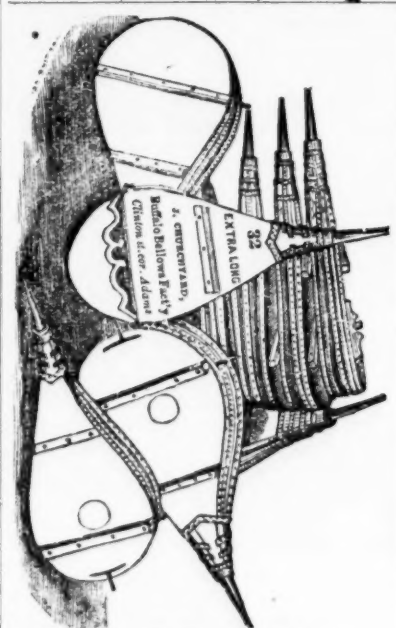
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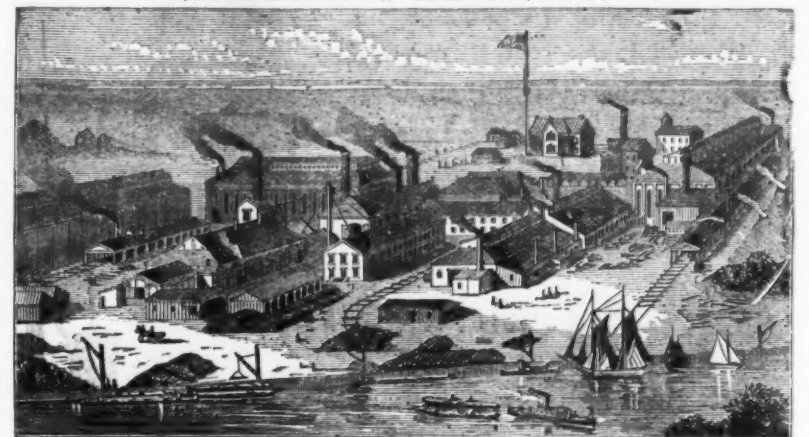
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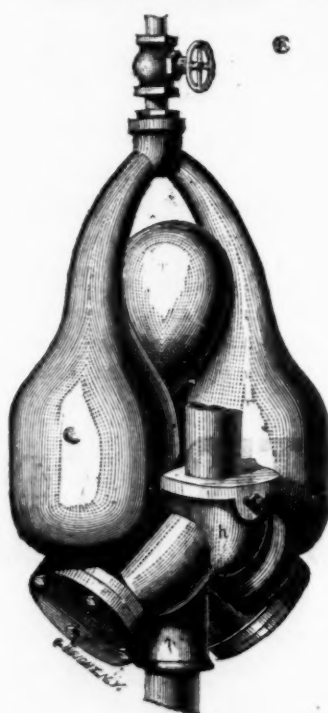
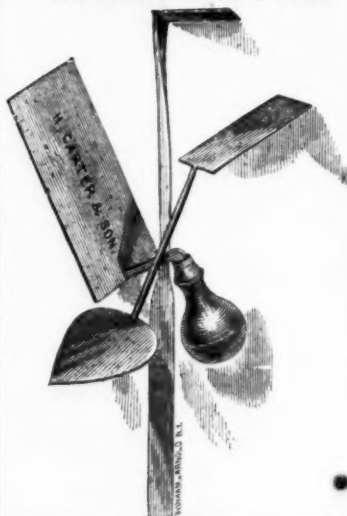
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Nothing to wear out.  
Will pump gritty or muddy water without wear or  
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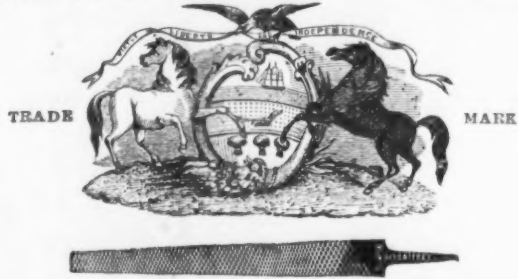
We put all files under seven inches in boxes of either one-half or one dozen each. These boxes are neatly arranged, and open on the end, on which the kind is plainly marked with printed labels, acknowledged improvements on the old methods.

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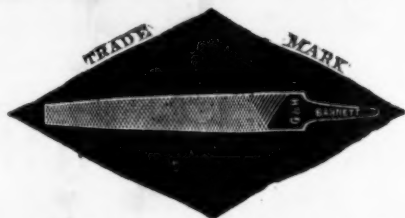
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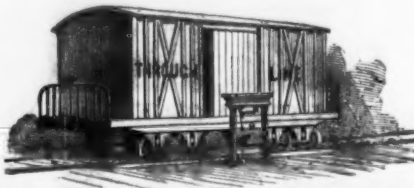


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**OTIS FURNACES & MINES.**  
**New Union Steam Safety Elevator,**

How One Works.  
UNIVERSITY IRON WORKS, DEWEY, VANCE & CO.,  
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Messrs. OTIS BROTHERS & Co., New York.  
Dear Sirs: The experience of a year proves that your *Furnace Elevator* is superior to all  
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1401 lbs. Pig Metal, or an average of near 65 tons per day, which required the elevator to lift 72  
feet high 4 1/2 tons Ore, Coke and Limestone for each ton of metal produced, or more than 11,500  
tons material in the 6 weeks. The largest yield in one day was 81 1/4 tons Iron, involving the lift-  
ing of 345 tons material in 24 hours. This has all been done to our satisfaction, and that, too, in the  
coldest weather we have had. Other furnaces with water and pneumatic hoists have experienced  
great difficulty, on account of the water freezing in the tanks; and in the case of the air hoists,  
we understand that two furnaces, not far from us, had to "blow out," from being unable to hoist  
stock during the "cold snap." The difficulty, we are told, was caused by the condensed moisture  
in the blast freezing to the sides of the cylinders, so that the piston could not move up or down.  
Very truly, yours,  
DEWEY, VANCE & CO.

**OTIS BROTHERS & CO.,**  
348 Broadway, NEW YORK.



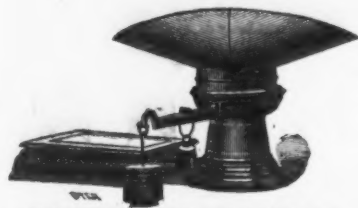


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 And sold by their Agents in all the leading cities and towns of the country.  
 The Scales made by this Company possess valuable *patented improvements* over all others. They have taken more first-class Premiums than all others during the past ten years. The Brandon Manufacturing Company guarantees all goods made by them to prove *satisfactory and superior to any other make.*  
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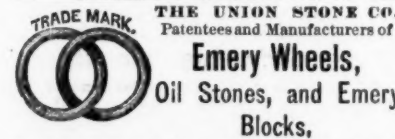
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 To order, in size and form to suit various mechanical  
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## Ford's Pat. Stove for Heating Air for Blast Furnaces

Adopted at 13 different Furnaces.

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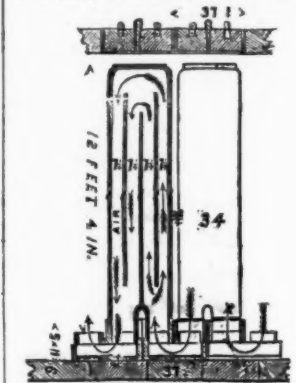
## PAULDING, KEMBLE & Co.

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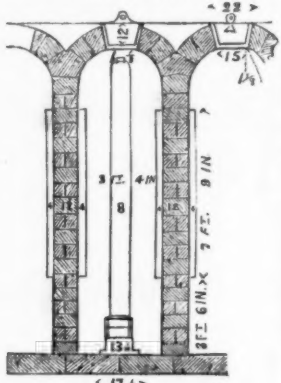
**JOSEPH CRAMPTON, Agent,**

23 19th Street, Pittsburgh, Pa.

Showing pipes lengthways in one section.



End view of one section.



REFERENCE.

PHILADELPHIA, Nov. 16, 1872.

PAULDING, KEMBLE & CO.:

GENTLEMEN: We have five sections of the "Ford's" Ovens in use since blowing in our new Furnace on the 21st of October. The Ovens have given entire satisfaction; we consider them superior to any Cast Iron Oven in use; they heat the air to a greater degree with much less gas and heat on the brickwork than the Player Ovens; they cost less for construction, and, we believe, will prove more durable, and less expensive to keep in repair. Our main difficulty thus far has been to keep the heat down to 1000 deg.; our average is from 1100 to 1300 deg.  
 In all cases the Cast Iron Key Boxes to form the arch should be filled in lightly with fire-brick blocks, laid dry and covered with loam, or, better, a cast iron plate, to cover the top, with a ring in it, so as to be easily removed.  
 We built our ovens in one block, entirely of fire brick; the cost of the brick work entire was about 5000 dollars, say about 1000 for each oven.  
 We put 4 courses of fire-brick in the bottom, laid on a loose slate rock, laid dry, and well grouted each course with Kaolin grout.  
 We can recommend the Ford Ovens with great confidence to iron men who wish to construct the best kind of ovens in use in the United States. Yours, truly,  
 J. B. MOORHEAD & CO.  
 P. S.—Our Furnace is now on her 3d week, making about 23 tons per day good Foundry Iron—15 feet bush, 60 feet high.

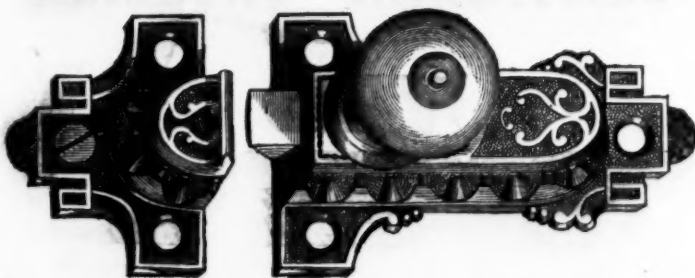
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18 & 20 Cliff Street, and 243 & 245 Pearl Street, New York.

Factories at KENSINGTON, CONN.

MANUFACTURERS OF

## BUILDERS' HARDWARE.



**Japanned, Brass, Plated, Enameled, and**  
**Bronze Metal Door Bolts,**

**Cupboard Catches, Sash Fasteners, Drawer Pulls,**  
**STORE DOOR HANDLES, etc., in great variety.**

Send for our new Catalogue and Price List.

## BUSINESS ITEMS.

NEW YORK.

Syracuse is engaged in a novel manufacturing enterprise, one firm there now constructing no less than seven mammoth windmills as large as the enemies of Don Quixote. The mills are designed for crushing gold ore, and are to be sent to the Island of Oruba, in the Caribbean Sea. The prevalence of trade winds in that section, and the high price of fuel, have induced the quartz crushing company to introduce windmills for ore crushing purposes. An accurate idea of the size of these powerful agents may be conceived from the following dimensions: The diameter of the wheel, which is of the "rosette" pattern, is 36 feet, thus securing power equal to a 20 horse-power engine. The weight of each mill is about 9000 pounds, the cost of construction being about \$1600 each.

PENNSYLVANIA.

The foundry of Lewis & Rosetter, in Pittsburgh, was burned on Saturday, July 12. Loss about \$30,000. A number of tenement houses adjacent were also destroyed, with five horses. Total loss about \$50,000.

The Pennsylvania Iron Works, at Danville, were established in 1845. They embrace four blast furnaces (the first in the world, it is claimed, built expressly for the manufacture of pig iron with anthracite coal), two puddled mills and one rail mill. The mill, it is said, made the first T rail manufactured in the United States, and the first thirty foot rail made in the world. The blast furnaces have a capacity of 30,000 tons, and the rail mill 36,000 tons per annum. The capacity of the latter is being increased 12,000 tons. The works consume 80,000 tons of ore, 20,000 tons of limestone, and 3500 tons of coal per year. The firm employs 1400 hands to whom they pay \$1,100,000 a year. The new furnace at Lebanon is about ready to be blown in.

Improvements are being made at the National Locomotive Works, Connellsville.

The Co-operative Car Company, at Oxford, will be in operation some time during the present summer. The works are nearly completed, and everything that money could procure has been secured to facilitate the execution of orders.

The largest casting ever made in Harrisburg was turned out at the foundry of the Harrisburg Car Company. The casting is 30 feet long, two inches thick, about eight feet wide, weighs about 14 tons, and is intended as a bed plate for the engine being constructed at the machine works for the new water works.

The Onondago Iron Works, of New Castle, has suspended operations for the purpose of repairing. Work will not be resumed until about the 1st of September.

Hussey, Wells & Co., Pittsburgh, are putting in at their works one of the largest size Ivens & Brooke eccentric geared power shears, weighing 38,000 lbs., and capable of cutting 1 1/2 inch steel. These shears are receiving the highest praise from all who have used them, the quick recovery after the cut being especially notable and useful.

The furnace owned by Reis Bros. & P. L. Kimberly, at New Castle, was blown out last week for repairs.

Of the steel works in that city, the Harrisburg Patriot says: Between 600 and 700 hands are employed at this extensive establishment, and on the completion of the additions now in progress at the works the number will be increased to nearly 2000.

NEW JERSEY.

James H. McGuire's foundry, at Trenton, gives employment to 26 men, and turns out over \$60,000 worth of work per annum.

McFarland, Sample & Evans, of the Novelty Iron Foundry, Trenton, make a specialty of light castings, such as iron railings for gardens and churches, as well as other fancy ornamental work.

DELAWARE.

A fire-proof stove for use in passenger cars, especially, was subjected to a severe test in Boston, recently. The stove is made of wrought and malleable iron. It is circular in form, composed of three upright cylinders and two cold air boxes at the bottom. The fuel is placed in the inner cylinder. The cold air rushing through the cold air boxes drives hot air outward and upward through the cylinders, the rounded form giving a very powerful radiation. The heat escapes through a register in the back. The whole is firmly bound together by strong iron bolts. The doors are fastened by patent locks. At the trial the stove, after the fire in it was well under way, was thrown from the staging upon which it was placed, to the ground, a distance of six feet. It was then rolled about, tumbled over and over, but not a spark of the fire was spilled upon the shavings which were scattered around. When the stove-door was opened the fire was burning briskly. This ingenious apparatus was invented and manufactured in Wilmington.

KANSAS.

The rolling mills which were established at Topeka, by Royal M. Bassett, of Connecticut, last spring, in consideration of \$150,000 in bonds being voted by that city in aid of the enterprise, were to have been moved to Kansas City, July 7. The machinery was loaded upon a train and pushed out upon the track, but, just as the engine was about to pull out, Sheriff Thomas served an injunction against their removal, and the rolling mill had to be rolled back again. The affair will doubtless cause trouble and litigation. The citizens claim that the bonds were voted in good faith, and that they are not responsible for the decision of Judge Dillon, which rendered them worthless.

OHIO.

A very useful fanning mill is manufactured by Hosford & Martin, at Monroeville, which combines a fanning mill, seed cleaner and smut machine. The company expect to turn out 600 of these machines the present year.

The furnace of the Bellaire Nail Works, now being erected, will be completed and in running order by about the first of next August. It is expected to run out about 40 tons of iron daily, and employ about 75 hands.

The blast furnace of the Ohio Iron Company, at Zanesville, is 16 feet at the boshes and 54 feet high, and makes from 43 to 45 tons of pig iron per day. The charge is 500 lbs. local (limestone) ore, 155 lbs. Lake Superior, and 90 mill cinder.

MISSOURI.

A company, mainly composed of Eastern gentlemen, with valuable Missouri ore beds under their control, have purchased ground in St. Louis for the erection of a large blast furnace, to cost about \$500,000. The company is composed of S. E. Blair and J. L. Ames, of New Jersey, H. M. Norton, of Pennsylvania, and two silent partners from Illinois. The erection of the furnace will be commenced at once.

Work on the bridge over the Mississippi, at Louisiana, was commenced July 4. A large amount of material has already been placed on the ground by Messrs. Reynolds & Saulsbaugh, of Rock Island, Ill., who have the contract for the substructure and approaches. The iron work, which is to be furnished by the Kellogg Bridge Company, of Buffalo, and the Keystone Bridge Company, of Pittsburgh, is well under way. The company intend to have the bridge completed by next December.

WISCONSIN.

The Howard Foundry and Machine Works cover two acres of ground at Fort Howard. The main shop is 100x75 feet, and the foundry is 40x75 feet. The stock of patterns in the two large pattern shops is worth from \$40,000 to \$50,000. The company makes mill machinery of all kinds, and during the four years it has been in business has built 14 engines and fitted up four blast furnaces. It is making extensive docks along the river front, and is about to build a new brick pattern shop. About 40 hands are employed.

MICHIGAN.

The first consignment of cars to England has been shipped from Montreal by the Dominion line of steamers. It consisted of three parlor cars and three sleepers, which were built in the company's shops at Detroit, and so constructed as to be perfectly ready to be built on their arrival in England. They are shipped in cases by sections, the sills and long timbers strapped together. On arriving at Liverpool they will be conveyed to the Midland Company's shops at Derby, and there built under the supervision of Mr. A. B. Pullman and Mr. Longstreet, mechanical superintendent of the Pullman Company, who will take out a corps of men from the Detroit shops. Everything is ready except the wheels. The English roads use a larger wheel than can be procured here, and hence the necessity for procuring them in England.

The Detroit Steam Forge of I. N. Ford & Son employs 45 hands and makes a specialty of car axles. The firm will do a business the present year of \$150,000. The works are partially run by an engine of 30 horse-power, made in Sandusky, Ohio. They have also in the works 4 smaller engines, and 4 boilers to run exclusively 4 steam hammers of great power. The boilers were made by the Detroit Locomotive Works, at Detroit, the Cuyahoga Works, at Cleveland, and by Desselle & Hutton, at Detroit. They melt fully 2000 tons of scrap iron a year, also large quantities of pig. The yearly labor pay roll will amount to \$22,000.

The Appleton blast furnaces are producing an aggregate of thirty tons of charcoal iron per day, one of them making iron for steel purposes for the Chicago Union Rolling Mill Company.

Compressed peat for blast furnaces is attracting considerable attention, and works for its manufacture are to be erected at Eagle Mills. The machines used for compressing peat have the power of pressing it to a substance as hard and heavy as anthracite coal, and are capable of turning out about fifty tons per day. Peat thus prepared, it is thought, will answer all the requirements of the blast furnace.

The L'Anse Charcoal Furnace Company, capital \$125,000, has been organized and is putting up works.

## The Metal Imports and Exports of France.

The following interesting statistics show the movements of metals at French ports during the first quarter of the current year, as compared with the corresponding period of 1872:

	Imports.	Exports.
1872.	millions.	millions.
1873.	934.	1094.

Unfortunately the details are not given comparatively, but we find that the export of rails is much reduced, while the imports show an augmentation of 5 millions for the quarter; and the high prices maintained by the French ironmasters having tended to that result, by these means the stock in hand grew in amount, and prices fell.

The actual condition of the trade during the first quarter of 1873 is fairly indicated by the following extracts:

	Imports.	Exports.
Iron ore.	2,543,000	1,281,000
Pig iron.	1,346,000	1,549,500
Bar iron.	624,000	1,619,000
Rails.	463,000	517,800
T and angle iron.	12,500	nil.
Sheet iron.	351,300	1,351,000
Tinned and other plates.	346,000	43,700
Thin sheet.	7,374	nil.
Iron wire.	53,800	236,200
Steel, in bars.	1,049,300	1,099,800
Steel, sheet.	159,800	nil.
Steel, sheet, thin.	23,300	nil.
Steel wire.	188,000	nil.
Copper, pure first fusion.	7,623,900	832,000
Copper, beaten or rolled.	58,700	473,800
Copper wire.	nil.	7,500
Brass, first fusion.	nil.	198,900
Brass wire.	46,300	nil.
Lead ore.	340,800	105,000
Lead in pig, etc.	3,518,900	933,300
T in mass.	3,099,300	77,700
Zinc ore.	293,500	88,500
Zinc, first fusion.	3,574,300	158,300
Zinc, rolled.	6,300	490,300



# HENRY DISSTON & SONS'

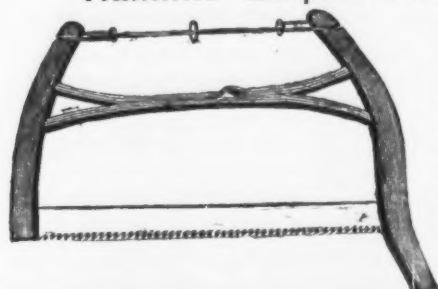
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Patented June 28th, 1870.



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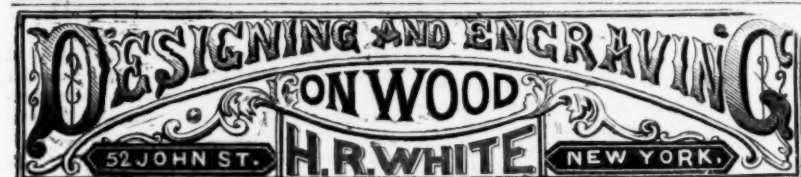
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And all other kinds of Springs, made  
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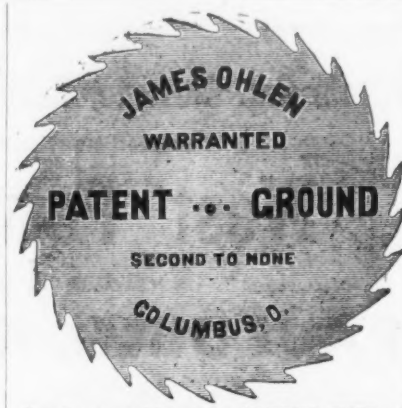
Indianapolis, Indiana,  
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Best Cast Steel Patent Ground Saws.  
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**CROSS-CUT SAW HANDLE.**

Best Patent Handle in use.  
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I make a specialty of the LARGEST SIZES of Circular Saws, and call particular attention of lumber manufacturers to the following points of excellence: **Evenness of Temper.**—The peculiar structure of my furnace subjects all parts of the saw to a DEAD heat, and when dipped in the oil bath secures perfect uniformity. **Perfect Accuracy in Thickness.**—My saws are ground on a patent machine, automatic in its operation, grinding off the thick places upon the plate before the thinner parts are reached, and when the saw is removed BALANCES PERFECTLY, which is proof positive of the right accomplishment of the work. **Properly Hammered.**—Great care is taken that no saw shall leave my works without due attention in this important particular. A saw too tightly strained upon the rim, or too loose in the center, cannot be successfully run—hence the importance of so hammering the saw as to effect equal strain in all its parts, and at the same time RUN TRUE. This department is under the personal supervision of myself, who has devoted over twenty years to the art of saw making. I am sole proprietor and manufacturer of the celebrated "Challenge" Cross-Cut Saw. Price Lists of all kinds of saws sent on application.

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Manufacturers of all kinds of **SAWS AND PLASTERING TROWELS.**  
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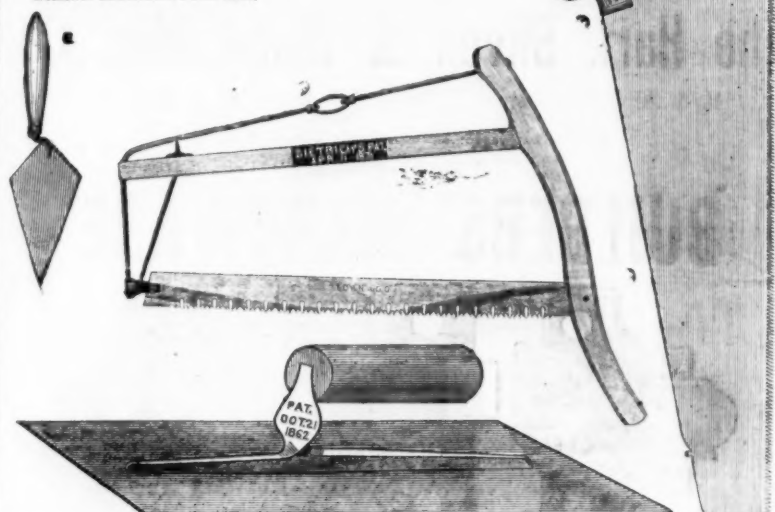
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A Challenge of \$500, toward expense of a public test, to prove that the Lightning Saws excel all others in Speed, Ease, and Simplicity, has been offered since 1870, and has never been accepted. More than 100,000 Lightning Saws were sold during the year 1872, the purchasers of which testify to their superior merits.

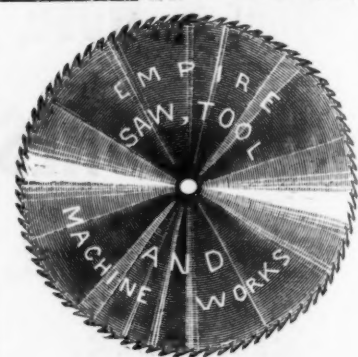
Our leading papers, such as the *Tribune*, *American Agriculturist*, *Christian Union*, etc., have published over sixty editorial notices recommending these Saws. Farmer's Clubs, Lumbermen, and Hardware Dealers unite in pronouncing the genuine Lightning Saw the greatest labor-saving implement of the age. I have hundreds of letters from practical sawyers, voluntarily written, expressing their entire approval of these Saws.

Where the Hardware Trade do not sell the Lightning Saw, I will send a 6-foot cross-cut and a buck saw-blade on receipt of \$1.

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General Machine Work executed to order.

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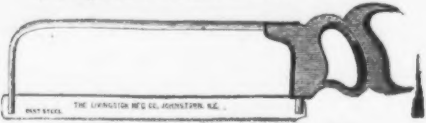


# T. F. CHERITREE & CO., MANUFACTURERS OF HARDWARE,

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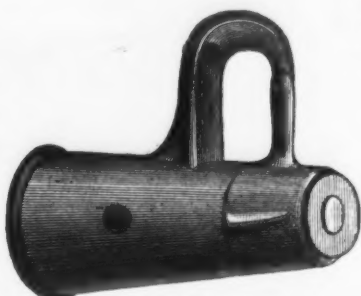
Livingston's Patent Butcher Saw.



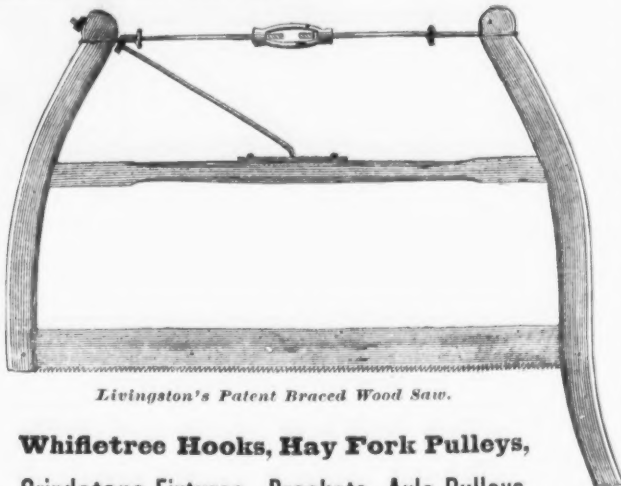
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Hay Fork Pulley.



Patent Whiffletree Hook.



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CUTLERY & TABLE KNIVES.  
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**B4 \* ANY**

## The St. Joseph Bridge.

The St. Joseph Bridge, which was opened with great public demonstrations on the 20th ult., is a very important engineering work. The contract for the entire structure was let to the Detroit Bridge and Iron Works. The designs were by Willard S. Pope, the president and engineer of that company. This company has built many of the finest engineering structures in the West, and have added greatly to their reputation by the successful completion of this contract. The contract price was \$700,000, the lowest of six bids.

There are three piers in the river bed. They were built with caissons, on the same plan as the great Illinois and St. Louis Bridge. They contain, altogether, 1,457,500 feet of timber, board measure; 16,038 feet of concrete, and 174,071 cubic feet of masonry. The base of the largest pier is 45x45 feet; the top 35 feet in diameter. Great difficulty was experienced in building the substructure. The main channel of the river was changed from the Kansas to the Missouri side, in order to bring it at right angles through the main draw of the bridge. This was done by a series of dykes and rip-raps, the construction of which consumed much time and money. The history of this portion of the work is exceedingly interesting, but too long for our columns.

## THE SUPERSTRUCTURE.

The bridge is divided into spans as follows, beginning at the abutment on the east side of the river: one fixed span 80 feet long, one pivot draw span 365 feet long, three fixed spans 300 feet each, making a total length of 1345 feet between the abutments on either side of the river. Each span is carried by two trusses placed 30 feet apart between centers, and carrying between them a flooring for railway and wagon way 18 feet wide in the clear. The floor-beams project beyond the trusses on either side for the support of foot walks 4 feet wide in the clear.

The bridge is built of wrought-iron throughout, except the upper chords of the 300 feet spans, and except the tracks, wheels, &c., of the turntable under the pivot draw span which are of cast iron. The tension members are forged eye-bars, of the required number and dimensions, varying from 1 1/4 inches to 3 inches, and from 2 by 2 to 6 1/2 inches. The compression members are of heavy rolled beams of such shapes and sizes as to best subserve the purposes for which they are designed. Every piece of iron is so formed and used that its entire surface is accessible at all times to the paint brush.

The general style of the structure is that known as the quadrangular truss, with parallel chords and inclined tie-rods. All the posts are vertical except those at the ends of each span, which incline over one panel. The lower chords, main and counter tie-rods and the bolts sustaining the floor system assemble at the foot of each post, and are then united by a heavy forged coupling pin. The upper ends of the tie-rods pass through the upper chords at the head of the posts, and drawn up by nuts which bear upon bosses provided for that purpose. The upper chords are in lengths of one panel each, and are united together over the post heads by a tenon and socket joint. Suitable pockets and bosses are provided in the upper chords for the reception of the upper lateral struts and tie-rods. The floor beams are suspended in pairs from the lower pin.

The above description answers for the fixed spans. These being placed permanently upon the masonry, the nature of their loading is uniform in its character and the strains consequently vary only in intensity, not in character. But in the draw-span the strains are constantly changing. When the draw is empty and swinging, one set of strains is met, and when it is closed and loaded, another set of directly the reverse nature takes their place. This of course necessitates a different form, both of material and of construction. The chords, therefore, are continuous throughout, and of wrought iron so designed in shape and dimension as to resist strains of both tension and compression. The posts, struts, tie-rods and floor system are of substantially the same character as that above described for the fixed spans.

The general characteristics of the various spans are as follows:

**EIGHTY FEET SPAN.**  
Two trusses, 8 feet high at 30 feet apart centers; 6 panels 13 feet 4 inches each. Weight of span including floor, 56 tons.

**THREE HUNDRED AND SIXTY-FIVE FEET DRAW SPAN.**  
Two trusses, 36 feet high at ends and 34 feet high at center; 20 feet apart; 2 center panels 11 feet 2 inches each, and 36 interior panels 13 feet each. Weight of span, including flooring and turn-table, 450 tons.

**THREE HUNDRED FEET FIXED SPANS.**  
Two trusses, 28 feet 3 inches high 30 feet apart; 21 panels 14 feet and 1 1/2 inches each. Weight of each span, including floor, 370 tons. Total weight of bridge, completed, 1816 tons.

The various parts of the structure are so proportioned that a moving load of 2500 pounds per lineal foot of bridge, together with the weight of the bridge itself, and the flooring, and tracks thereon, shall bring on no part a greater strain than one fifth its ultimate capacity. To illustrate. A single 300 feet span weighs say 370 tons. The assumed moving load (2500 pounds per foot) for the entire span amounts to 375 tons; the sum of both dead and live load is therefore 745 tons. The assumed breaking load of the bridge is five times this or 3725 tons. The assumed live load viz., 375 tons, is considerably in excess of any real load that can be brought upon the bridge. A string of locomotives reaching from end to end of the span will weigh less than 300 tons, while an ordinary train drawn by one engine and reaching entirely across the span will weigh about 300 tons. Then it will be seen that the assumed maximum load

is actually larger than can occur in practice. As a further assurance of safety, every bar of iron in the bridge has already endured an actual tensile strain fifty per cent. greater than the imposition of the maximum load can bring upon it in the finished bridge. Before leaving the works at Detroit, every bar of iron was placed in the powerful hydraulic testing machine and there subjected to an actual tensile strain fifty per cent. greater than its computed duty, and while under such actual stress received several sharp blows from a hammer. Any concealed flaw or imperfection in workmanship was very sure to be revealed by this treatment. When to this is added that none but the best and toughest kind of iron is used, and that the most scrupulous care is used in all the various processes of manufacture, and that each part is so arranged as to utilize its entire strength, it may be fairly assumed that ample strength has been provided.

The St. Joseph bridge was permanently located July 14th, 1871. The first train passed over it May 20th, 1873, and trains have been running regularly ever since.

## The Indiana Exposition.

Those proposing to become exhibitors at the exposition shortly to be opened at Indianapolis, as well as those interested in industrial expositions generally, will be glad to know that the structure erected for this purpose will afford accommodation for a vast and varied display of manufactures and products. The Grand Hall is a magnificent structure of brick and iron, 308 feet long by 150 feet in depth, fronting south on a wide and well graded street. The northwestern quarter of the building on the first floor will be devoted entirely to the exhibition of engines and other mechanical devices, motive power for which will be furnished by a large engine and two boilers, the engine in the corner of the building and the boilers on the outside. The quarters of State Board of Agriculture, secretary, treasurer, assistant secretary, and the various check rooms and ticket offices, together with a room for the exclusive use of representatives of the press, will occupy the front of the structure. Light machinery and the smaller agricultural implements will be placed in the remainder of the western portion, while the eastern half of the hall will be used as a miscellaneous department. The second floor will be reached by wide stairways at both ends, beneath which are the ladies' dressing rooms. On this floor will be found the Fine Art Department, which will be one of the principal features, and also the department for the display of textile fabrics and a considerable amount of space for miscellaneous articles. Some of the smaller pieces of machinery will also be placed here. Directly above the offices desks will be placed for the accommodation of merchants who desire to display samples of goods. At the left of the main hall is a wooden building 158 by 76 feet, intended for machinery and agricultural implements. Shafts will be run through this building from the main edifice, for the purpose of affording exhibitors an opportunity to display the practical working of such machinery as is intended to be run by steam. Part of the boiler room will also be set apart for machinery. The accommodations for all descriptions of mechanical appliances are unsurpassed, and the premium list includes an almost innumerable list of articles in this line. It is intended to make this department one of the great attractions, and from the number of applications already received for space there is no fear that manufacturers will fail to appreciate the advantages that are to be derived from exhibiting the products of their institutions at the Exposition.

At the right of the Exposition building proper is the floral department, a long building 250 feet in length and 80 feet in width, which will be fitted up in rustic style, with shrubbery and flowers of every known variety arranged in a tasteful and artistic manner. Seats will be scattered here and there for the use of those who may grow weary by the wayside. A restaurant can also be found in the northern portion of the Floral Hall. The eastern end of this hall connects with what was formerly the Furniture Hall, but what will now be used as the Agricultural Department. Here the agriculturist can feast his eyes upon farm products. The space that has been set aside for this department is one hundred and thirty-four by one hundred and fifty feet. A few rods to the north can be seen the old floral hall, which will be used exclusively for horticultural and pomological displays. This is an octagonal structure about 100 feet across, and will be well filled as there is no class of agriculturists that take more pride in exhibiting their products than the professional horticulturists. The frontage of the numerous buildings designed for exhibition halls is over nine hundred, feet or nearly one fifth of a mile, and will afford more than three hundred thousand square feet of space under roof, arranged in the most modern style, adapted to the display of articles of every branch of industry, and will together, with the improvements on the grounds, cost fully one hundred thousand dollars.

Gas mains have been laid to the grounds, and both the buildings and grounds will be brilliantly illuminated at night. Abundant supplies of water will be furnished, being carried in pipes to all parts of the buildings, and everything will be arranged to the best possible advantage and comfort of visitors and exhibitors.

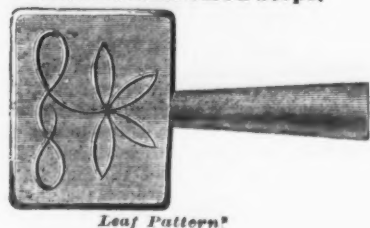
The live stock and agricultural show will add largely to the interest of the exhibition. The great State of Indiana is noted for her fine stock and agricultural products. Every facility will be afforded exhibitors in these departments, thousands of dollars being offered in premiums. The premiums offered in the several departments will aggregate over twenty thousand dollars.

Arrangements have been perfected with the railroads centering at Indianapolis, by which passengers and freight will be carried at reduced rates. Further particulars may be obtained from Alex. Heron, secretary, Indianapolis, who will supply premium lists, and give any desired information.



# H. D. SMITH & CO., PLANTSVILLE, CONN.

Patent Embossed Steps.



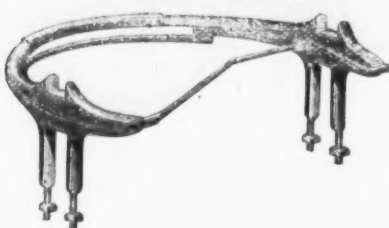
Leaf Pattern.

King Bolt Yokes.



Established 1850.

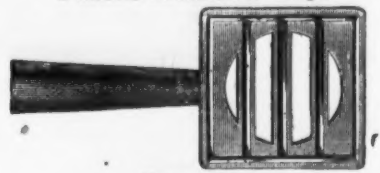
No. 6 Fifth Wheels.



1871 Pattern Shaft Couplings.



Patent Cross Bar Steps.

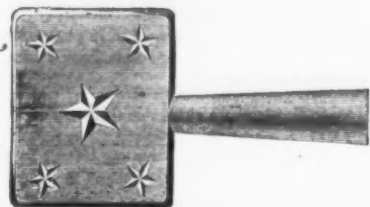
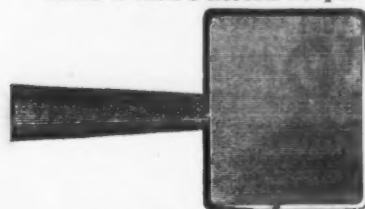


Upper View.



Lower View.

Solid Plain Pattern Steps.



Star Pattern.

Smith's Improved Philadelphia Pattern Slat Irons.



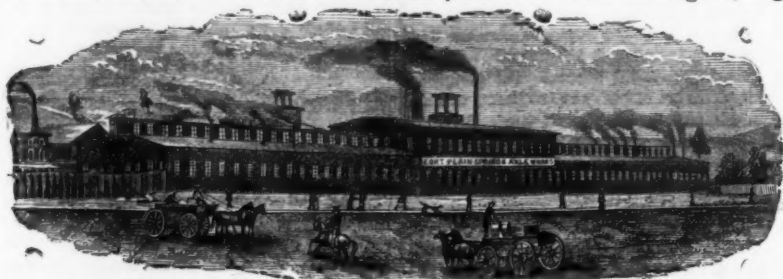
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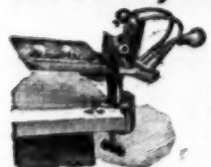
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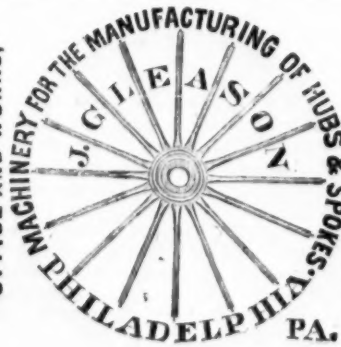
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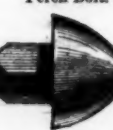
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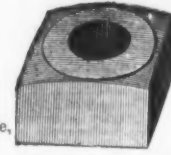
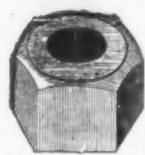
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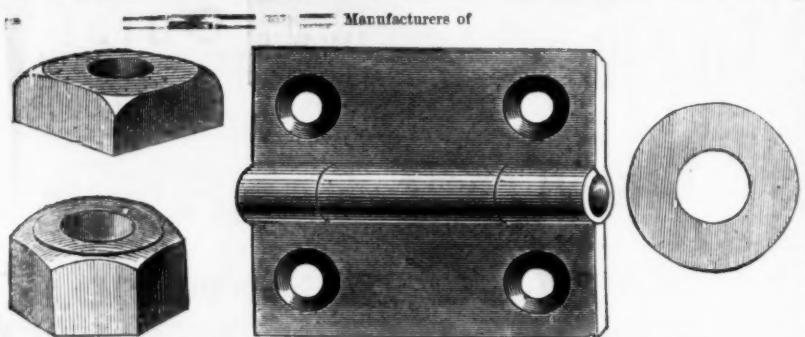
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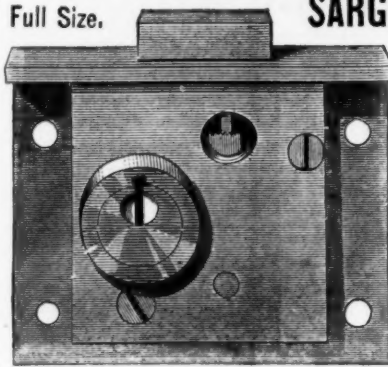
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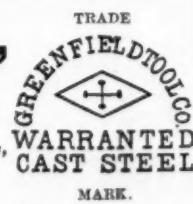
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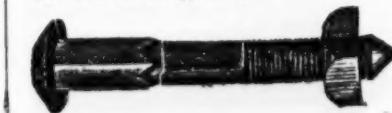
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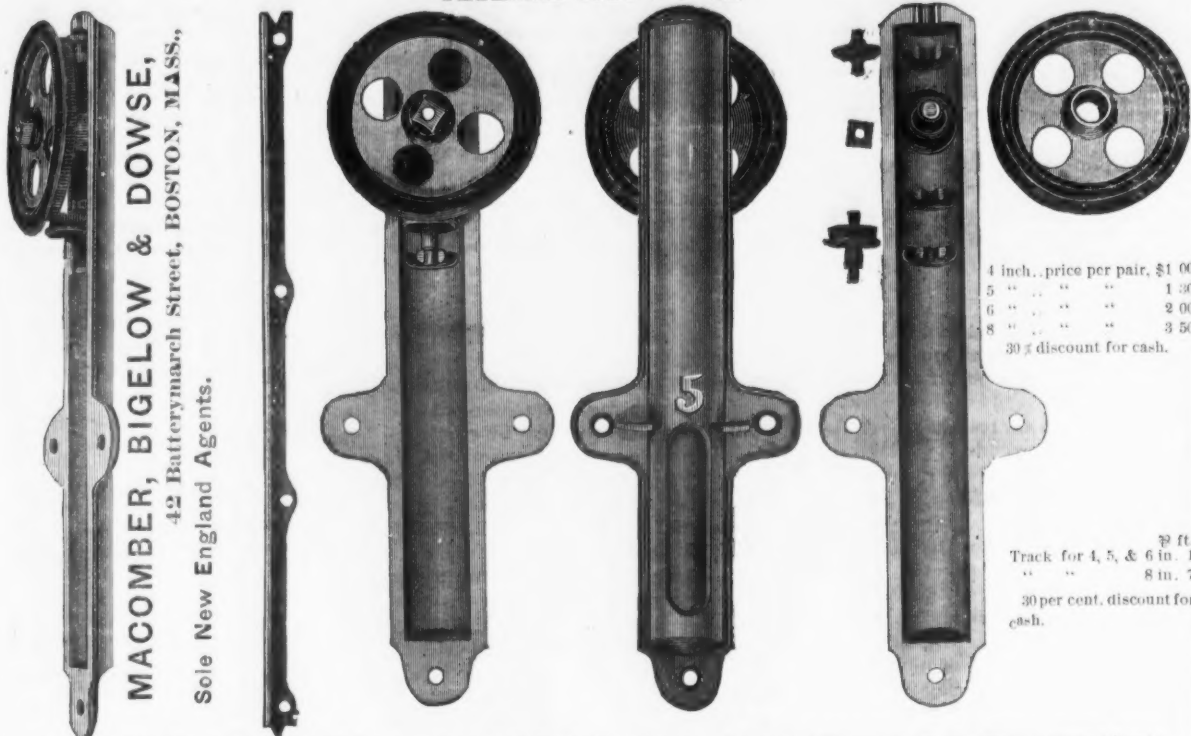
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Track for 4, 5, & 6 in. 1  
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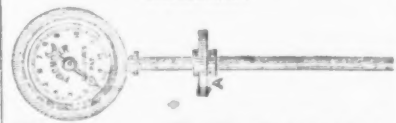
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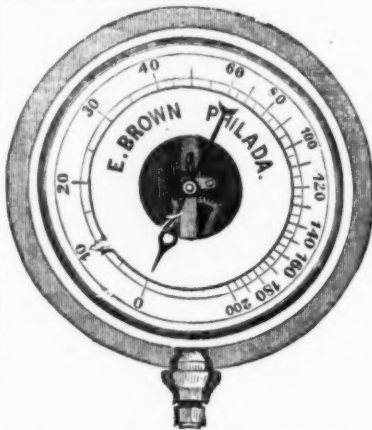


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# The Iron Age.

New York, Thursday, July 24, 1873.

DAVID WILLIAMS . . . . . Publisher and Proprietor.  
JAMES C. BAYLES . . . . . Editor.  
JOHN S. KING . . . . . Business Manager.

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## Certain Necessary Inventions.

From an ethical stand point, it may be regarded as the duty of every one gifted with an inventive talent to employ it in whatever direction will lead to results which promise most benefit to society. Upon capitalists, manufacturers and managers of industrial enterprises devolves, in turn, the duty of testing and adapting to useful employment inventions and improvements brought to their notice, not only to insure the ends immediately proposed, but to encourage further effort in those directions whence safety to life and limb and progress in the arts are mainly found.

A notable illustration of the truth of these remarks may be found in the "accident" which occurred at No. 49 Dey street, in this city, on the 21st of June, whereby several persons were severely wounded, one or two fatally, as reported at the time of this writing. Like numberless other so-called accidents, this calamity might have been averted by the exercise of a little ingenuity, or, in other words, by the production of a simple device to do safely and quickly that which a reckless stupidity chose to do dangerously and slowly by a clumsy method. A large quantity of condemned copper-cased cartridges were being taken to pieces, the shells to be sold as old copper, the powder to be collected in bulk for re-use in other forms, and the lead to be re-melted. These cartridges, as is well known, have their fulminating powder, to be exploded by percussion, enclosed in the base, and the danger of subjecting them to concussion is manifest. Yet, in spite of this, the mode adopted for separating the bullets from the shells was to screw the cartridges in a vise, and with a chisel dig out the lead. The account before us does not state specifically that a hammer was used, but whoever is familiar with the difficulty of cutting metal without this appliance, will

scarcely doubt that it must have been employed. At all events, a cartridge exploded under the hands of the operator, several others followed in quick succession, the loose powder lying about ignited, and the whole place was soon a scene of fire, confusion, and deadly casualty. Now, we venture to say that there is not one in ten among the readers of this article who could not in two hours provide a device for removing bullets from their copper shells without the slightest liability of setting off the priming, and at a rate twenty-fold faster than that so clumsily and so unfortunately adopted. In point of safety it would have been essential to avoid jar, and a firm pressure on the parts would have been preferred to a sudden or jarring application of force. To insure quick work the trouble of clamping in an ordinary vise would have to be avoided. It is quite easy to conceive that all conditions might have been met by a simple clamp grasping the body of the shell an eighth of an inch from the rim, and another gripping the projectile itself, so that a gradual though speedy movement apart would separate the two. We do not say that there might not be a dozen better ways of accomplishing the same result, but something of this kind would undoubtedly have prevented the catastrophe.

But this is only one of a class of casualties that are continually occurring. A year or two ago, and not a hundred rods from the scene of the accident just mentioned, another explosion occurred. It was of fireworks carelessly handled, and in the brief attention it excited, brought out the fact that many persons employed in fireworks manufacture lose their eyesight by comparatively slight explosions of the material with which they work. That safety might in many instances be secured by a strong, iron bound plate of glass interposed between the face and the hands of the workman, is evident at a glance. In lieu of this, thick spectacles would answer a good purpose, aside from the possible detriment to eyes never accustomed to them and not ordinarily needing them. People are notoriously careless with gunpowder; witness the smokers who, three or four years ago, in Park Row and Chatham street, fired the wagon load of rockets and Roman candles on which they were riding, and blew three or four of their reckless number out of the world. Hence, any improvement, great or small, from the safe storage of tons of gunpowder to the prevention of conflagration from fire-crackers, which will nullify carelessness and put it out of the power of people to do mischief to themselves or others, would be a public benefaction, and yet no one thinks it worth his while to employ inventive talent in these directions, doubtless because of lack of encouragement. Some years ago a blind man, an English inventor, Mr. Gale, projected a method of storing gunpowder without liability of explosion, by mingling it with ground glass. The minute particles of glass so separated the powder grains that the flame crept, as it were, from one to another, and the mass burned slowly instead of exploding. When required for use, the powder was to be separated by a riddle or screen. But this plan was troublesome, and much greater space was required for storage, and it amounted to little or nothing. Gunpowder kept in subterranean magazines, under guard, is safe enough, but if it were made impossible of explosion until needed, by some cheap, simple and convenient means, the originator would earn the gratitude of humanity. And now a word as to fire-crackers. It is a little discreditable to our inventors that 4th of July should be celebrated by Young America with paper guns brought from the antipodes. If machine-made fire-crackers were manufactured here, no doubt some one would soon hit upon the idea of fire-proofing the paper, and then it would be impossible for the juveniles to burn up half a city in four hours, as they did in Portland, Me., half a decennium ago.

There is scarcely a branch of manufacture or a department of industry in which there does not lurk a source of danger, laying the duty of prevention on inventors and users alike. It is not long ago that cases of explosion with dentists' vulcanizing vessels were far from uncommon; and in England kitchen boilers have afforded numerous similar examples for lack of some safety appliance. Some simple device for testing kerosene, capable of safe and easy manipulation by an unskilled person, would go a great way in preventing loss of life from too volatile illuminating oils, and the adoption of improved hatches for hoistways would prevent such accidents as, the other day, in an up-town ware-house, hurled a poor fellow down the depth of three stories to the basement floor, because of a careless step. These may seem like minor matters; but they concern human life and limb, and that is enough to demonstrate their importance. And if those be not sufficient, our mines, railways and steamships furnish opportunities of greater magnitude for humanitarian work in the same direction.

## Railway Reform—The Block System in England.

The select committee of Parliament lately appointed to report upon measures now under consideration for the prevention of railway accidents, have recommended that action be postponed until more opportunity can be had for the investigation of the subject, and a bill prepared which will tend to insure protection to railway travelers by the easiest and most effective means. The principal bill relating to this subject now before Parliament, and to which the committee chiefly refer in their recommendation that action be postponed, is one providing that two systems, known respectively as the "block" and the "interlocking" systems, shall, within five years from the passage of the act, be adopted on all the railroads in Great Britain.

As most of our readers probably know, the block system consists in certain arrangements for dispatching and running trains by which the various sections of the track are "blocked," or closed, until the trains passing over them shall have left the line clear. The object sought is to prevent the possibility of collisions, and it may be said to accomplish this object in all but the most exceptional cases. The interlocking system consists in such a combination of the machinery by which the points and signals employed in the block system are worked, as precludes the possibility of any difference between them, and guarantees that the intelligence conveyed by the signals shall correspond with the disposition of the points. Together they constitute a system as nearly perfect as possible, and the committee admit that their adoption would tend to promote the safety of life and limb on railways. The objections commonly urged against them are rejected by the committee as trivial and unfounded. It has been held, for example, that if so many signals were required before a train could pass the various stations on its line, a much lower average speed would be necessary, and passengers would lose time. The committee report, however, that on well-managed railroads the block system has not been found to interfere with the running of trains at high speed, and that it insures a degree of safety not attainable when a certain fixed distance is not preserved between trains running in the same direction. It has also been held, by those interested in defeating the bill, that the multiplication of mechanical arrangements and precautionary appliances had the effect of diminishing the sense of responsibility now felt by engineers, but this consideration the committee dismissed as unimportant. They say that on many single lines these systems have been found indispensable to safety in the running of trains, and they accord them unqualified approval. The recommendation that compulsory legislation be postponed is based upon good and judicious reasons. The committee say that the railroad companies are now doing much to promote the safety of travel, and have inducements to do more, and that so long as this disposition is manifested, it is best to leave the adoption of improvements involving large outlays of capital to those who are immediately responsible for the management of the lines. It must be remembered that in England "responsibility" means something very different in this sense from what it means in the United States. During the past two years the British companies have paid damages to the amount of nearly two and a half millions of pounds sterling, and they have, therefore, a direct pecuniary interest in rendering their lines as safe as possible.

It would afford us much satisfaction to note evidences of a similar disposition on the part of railroad managers in this country. In some few instances our railroad companies are doing all in their power to make travel both safe and comfortable, and accidents upon lines thus managed are few in number and generally of slight importance. But notwithstanding the too general neglect of precautionary measures, it may be doubted if the evil is one for which our State legislatures can safely prescribe specific remedies. The chief difficulty lies in the fact that different States would require the adoption of different systems, and that no harmony of action could reasonably be expected, even between adjoining States traversed by lines over which both exercise partial jurisdiction. How it may be in the future we cannot say, but for the present, at least, the only practicable method of promoting the safety of life and limb on railways is for the several States to fix upon the companies a measure of legal responsibility which they have hitherto escaped. The spectacle of a great and powerful railroad company fighting a suit for damages from court to court until the plaintiff, unable to sustain the tedious and costly litigation, accepts a compromise of his claim and retires impoverished and, by reason of his injuries, unfitted for either the duties or the pleasures of life, is not an edifying one to contemplate. The railroad companies in this country have had altogether too much

opportunity to make law suits a terror to their victims, and the measure of their responsibility needs to be more clearly and specifically defined. When this is done, and each accident from preventable causes resulting in death or injury shall cost them heavy damages, we shall see many and important reforms in railway management. The "direct pecuniary interest" of the companies in the safety of passengers, which obviates the present necessity for compulsory legislation in England, is what we need in this country, and each State can perform its duty in this respect without reference to the laws of its neighbors.

## Blast Furnace Slag.

Notwithstanding all that has been said and written on the subject of the utilization of blast furnace slag, the question of how to turn it to practical account by economical methods remains, as yet, unanswered. At the last meeting of the Iron and Steel Institute, Mr. I. Lowthian Bell remarked, in the course of debate, that he, for one, would be very glad to learn how he could utilize practically the slag product of the furnaces in which he is interested, and from this remark it may be concluded that the problem has not yet been solved in England. The brittle nature of slag constitutes the chief difficulty in the way of making it generally useful, and better materials can be had for the purposes for which it is proposed to employ it at a cost but little, if any, greater than that of preparing slag, or of combining it with any other substances calculated to give it cohesiveness and strength. It is probable, however, that we have as yet only determined in part what cannot be done with slag. What can be done remains yet to be discovered. In the enormous and ever increasing slag product of our furnaces we have a material capable, while in a molten state, of being molded into any desired form, and which, when solid, would resist any degree of heat below that which in the furnace was needed to fuse it—a heat, it may be remarked, far greater than any to which it could well be subjected under any other conditions; and it is not too much to hope that scientific research will determine the question of what uses it is adapted to before many years.

Among the recent experiments in the adaptation of slag to useful purposes, those of Mr. Charles Wood, of the Tees Iron Works, command most attention at the present time. Mr. Wood's machine for granulating slag, which we illustrated and fully described in our issue of May 1st, seems simple in construction and effective in its operations. The slag is disintegrated by being run from the furnace upon a slowly revolving disc, and is further cooled by water, after which it is brought in contact with a set of automatic scrapers, which break it up and deposit it in vehicles adapted to its transportation to the place where it is to be used for road making and other purposes. Another machine, by the same inventor, converts the slag into a coarse sand, which, when combined with 10 per cent. of quicklime, makes a very good cement, and, when pressed, a good quality of brick. Mr. Wood has made several hundred tons of these materials, all of which have been employed in the manufacture of concrete in important works. To what extent Mr. Wood's systems are susceptible of practical adaptation to the economical treatment of slag in large quantities we do not know, but we believe it has not yet come into very extensive use in England, and that it is still experimental.

Among the many attempts which have been made in this country to utilize slag, none have led to results of sufficient importance to command the attention of iron makers generally. At Lebanon, Pa., for example, slag has been run into thin slabs and used for sidewalk paving, but although it looks very well it breaks readily and has not proved satisfactory or economical. These qualities have generally been found to interfere with the use of slag as a building material. We have not space in this article to enumerate the various attempts, more or less successful, which have been made in Europe to utilize slag, but experience seems to show that the greatest promise of success is found in the efforts now making to mold slag into brick and artificial stone. We are not aware that this has ever been accomplished on a commercial scale in this country, but it has in Europe, by the devitrification effected by cooling the slag under pressure, and subsequently annealing it. This process is carried on very successfully in Belgium. In France, a method is employed of making sand from slag, which is chiefly valuable for making artificial stone. It is also an excellent molding sand, and makes a good quality of concrete for building purposes. Attempts have also been made to make an artificial porphyry from slag by allowing it to cool slowly and under certain conditions, but we have not heard that the process has been extensively employed anywhere. These are about all the important uses yet found

for slag, and none of them possess much interest for American iron masters, for the reason that artificial stone is not much needed here, and materials for concrete are both abundant and cheap. We believe, however, that a use will be found for it, perhaps in connection with the introduction of fire-proofing in buildings, now gaining in popularity in this country, and that our slag product will possess a commercial value sufficient to render its preparation profitable. The subject is one which merits more careful and thorough discussion than it has yet received from the societies and associations representing the iron interests of the country, and the benefits likely to result from the discovery of some simple and economical process of making slag useful are so great as to afford ample encouragement to experiment and investigation on the part of our metallurgists, chemists, and practical iron makers.

## Scientific and Technical Notes.

Newspaper correspondents see very wonderful things, sometimes. For example, a correspondent of the Chicago Tribune, who has made the acquaintance of a new

OXY-HYDROGEN ENGINE, says of it: "I have been shown the elements and drawings of an engine to be propelled by the combination of oxygen and hydrogen in the presence of flame, producing expansion, and, of course, explosion, if not under control. This power can be generated at a trifling expense—not to exceed one-fourth that of steam. And, by saving the weight of fuel and much of the weight of machinery, with greatly increased activity of engine, the result is a great gain. The momentum acquirable in this way is believed to be such that ships may cross the Atlantic in three days, or even in less time. The paddle appliance is also a novelty—simple, but efficient. This power is applicable equally with steam or water to any kind of machinery."

The firm of Messrs. Dunlop & Meredith, of the Cliff House Iron Works, West Hartlepool, have just completed

THE HEAVIEST GUN METAL CASTING EVER MADE, viz.: the stern frame for a Brazilian armor-clad man-of-war of 5400 tons register, now in course of building at the shipyard of Messrs. J. & W. Dudgeon, of Cubitt Town, London. The dimensions of this monster work are 26½ feet by 21 feet in length, and 9 feet 10 inches between the frames. The "body" through which the shaft of the propeller is to pass measures 2 feet 9 inches in internal, and 3 feet 9 inches external diameter, and the estimated weight of the whole is upward of 25 tons. The outer part is 22 by 10 inches in thickness, and the inner one, which is "stepped" to receive the armor plates, is from 7½ inches down to 1½ inches thick. In addition to this highly successful work, the above firm have been entrusted with the order to cast the stem and rudder frame, equally massive works, of the same material.

Mr. F. W. Harley's paper on COAL GAS AS A FUEL contains many interesting and useful suggestions. The employment, he said, of coal gas, and of other inflammable gases, in place of solid fuel had been advocated, but, so far as his knowledge extended, no attempt had hitherto been made to show by reference to known facts, and by calculations based thereon, the relative commercial value of coal gas and of solid fuel for heating purposes. Dealing with coal first, its value for heating purposes was usually expressed by a statement of the number of pounds of water which one pound of coal was capable of converting into steam from the boiling point, or of raising 1° Fah. in temperature. The heating power of coal differed very widely, and there was, beside, a very wide difference between the theoretic value, calculated from composition, and the actually attainable heating value of coal. Having given a few examples of this difference, the writer stated that in some of the large water works, and with engines worked on the expansive system, less than 3 lbs. of coal sufficed per horse-power per hour, and it was claimed for some engines of 50 horse-power to 100 horse-power that about 2 lbs. of coal, or less, sufficed per horse-power per hour; but in smaller stationary engines there could be no doubt that the consumption ranged from 7 lbs. to as high as 14 lbs., or 15 lbs. of coal per hour; and as gas was really available only for small engines, these weights must be taken as the bases for comparison. Mr. Goddard stated that with the Jackson boiler 100 cubic feet of gas were required per hour, and it followed that the cost per hour would be for gas 4/8d. as against 0/6d. for 7 lbs. of coal, or as against a fraction over 2d. for 15 lbs. of coal; so that, on the face of these figures, gas was manifestly a very expensive fuel, and it was quite evident that wherever engines were required for continuous work there could be no question as to which kind of fuel was to be preferred on economic grounds. All published facts and reasonings tended to prove that gas could never on the larger scale compete with solid fuel, whether the application was for heating water to supply steam to engines, or for other purposes; for even if coal engines were manufactured for the purpose at one-third the price he had assumed, so large a margin would be left in favor of solid fuel as to put gas out of competition. Very similar relations held in respect to the two kinds of fuel when used for cooking on a large scale, but in the case of what might be called dry cooking—baking or roasting—gas was by far the most advantageous, because it could be put into full operation the moment it was wanted, and its combustion stopped the instant that the necessity for its employment ceased. Mr. Hartley then proceeded to institute a comparison between gaseous and solid fuel in their application to the warming of rooms, the conclusion he came to being that coal was more advantageous when all things were taken into account.

Mr. Nehemiah Gibson, of Boston, proposes A NOVEL TRANSPORTATION SCHEME, by which he hopes to shorten and cheapen water transportation between the coal producing districts and the port of Boston. His plan provides for the construction of iron barges to carry coal from New York, Philadelphia, or Baltimore, by way of Narragansett Bay and the Taunton River, in Massachusetts. The vessels are to be very strong, each to hold four hundred tons of coal, and to be propelled by tug boats. From some point on the Taunton River he thinks that a railway can be constructed upon which these barges can be taken from the water and carried overland about twenty miles to the cars at Weymouth. In this way one hundred and fifty miles of sea transportation will be saved without breaking bulk. The construction of the road and the barges, however, will be very expensive. The rails, will, of course, have to be very large, made of steel, and laid on a road-bed much wider than the ordinary railway.



## British Railway Brakes.

BY JAMES A. WHITNEY, M. E.

## II.

The present articles are designed, not to sketch the salient features of all English brakes, which is manifestly impossible, or to present even examples of each class, which would be difficult within the space to which these writings must be limited, but simply to notice those systems of mechanism or methods of construction which may warn against useless effort by their failure, or lead to further improvement by characteristics of at least apparent merit. In the matter of the mere transmission of power from the prime mover to the brake-bars much ingenuity, displayed in complex arrangement of levers, rods, screws, spurs, wheels and toggle-joints, has been wasted, and the means proposed for substituting these by simpler, if not more efficient, devices possess somewhat of interest and possible utility.

And first on the list may be mentioned with some fullness the earliest "steam brake," the anti-type of the atmospheric brake, inasmuch as in the latter as in the former an elastic aeriform body provided the actuating power. This was patented by Robert Stephenson, Oct. 7th, 1833. It comprised a "brake or clog" caused to press on the tires of the locomotive "by means of a piston working in a small cylinder supplied with steam from the boiler."

In 1835 William Carpalin produced an apparatus which seems to have depended upon the absorption of power from the momentum of the train by causing it to be diverted and consumed in driving a quantity of liquid through a small orifice. The novelty is set forth as consisting "in a mode of stopping railway trains or carriages by the employment of a piston which is made to work backward and forward through the medium of an eccentric, and to drive to and fro a quantity of oil through a small passage uniting the two ends of the cylinder. The passage is furnished with a stop or valve of such size that when fully open it affords little or no resistance to the passage of the oil, but which partially closed offers such resistance thereto as to cause the piston to act as a brake, and to either retard or stop the motion of the train." It is difficult to see how the friction of oil in its passage through an orifice, however small, could be made effective for the function mentioned, and, if there be any utility in the project at all, some liquid possessed of greater viscosity would answer a better purpose.

In 1841 Walter Hancock suggested a brake actuated by water from the boiler, the water being conducted to cylinders, the pistons of which acted directly upon the brakes. Of course the pressure would be proportioned to that of the steam in the boiler, and the only advantage apparent over the admission of steam direct to the brake actuating cylinders, lies in the avoidance of the condensation which would occur with the latter. But, manifestly, this would be offset by the loss of all the heat in the water ejected from the boiler, for there seems to be no method shown of returning the water to the boiler when the brakes were released; and even if this were done, the additional complexity would nullify any advantage derived from it.

In 1843 J. H. Pope proposed the use of "screws for forcing brasses against the axle," in lieu of the usual application of brakes, a plan on the face of it too ridiculous for serious consideration.

The use of a liquid for transmitting power is of remote origin, but within the past three decades has received manifold applications, ranging from the operation of cow milking machinery to the working of power drills. Its earliest projected use for railway brakes appears to have been that of Frederick Lipscomb, in 1843, and the abridgement of the British patent condenses the description into such small compass that it is here quoted entire:

"The brakes, which are of the ordinary character, are brought into action by turning a screw, which forces down a plunger in a certain cylinder, from which a pipe proceeds to a second and smaller cylinder containing a piston, there being between the plunger and the piston a quantity of oil, water or other liquid, by which the movement of the plunger is communicated to the piston. At the end of the piston rod is a rack, which is in gear with a pinion fixed upon a shaft passing across the carriage (car), and having upon it other pinions by which, through the medium of other racks and cars, the brakes are pressed against the wheels. The screw is turned in applying the brakes, by means of a strap coiled round a drum, which is fixed on the upper part of the screw, but is turned in releasing the brakes by a winch, the plunger being furnished with a helical spring, which prevents the brakes from leaving the wheels when in action, should the winch be at liberty." The use of a liquid for transmitting power under the complex and rough conditions of railway practice is obviously inferior to that of atmospheric air for the same purpose, but in the present emulation to secure novelty as well as utility in this class of mechanism, it is quite likely that recourse will, to some extent, again be had to this hydrostatic method of giving motion to the brake blocks. Apropos of these last, in 1844, one John Melville projected a brake to be placed on the tender, and comprising wooden blocks encased in iron shells, and forced down upon the wheels by vertical screws, the friction of the surface of the blocks kept constantly wet by a flow of water, in order to increase their retarding hold upon the wheels.

The earliest specified use of atmospheric air in the English records, is the communication from Eugene Viscount de Beuret, presumably a French projector, and whose invention differs more widely from the present atmospheric brake than does the steam brake of Stephenson. For de Beuret placed between the ordinary rails of the track, which he designated as a rubber, a long rail fitted to be clasped between the long jaws of a kind of clamp carried by the car, and forced toward each other to grasp the rubber (and by friction thereon retard the train) by springs formed either of metal or by the compression of air in cylinders.

The earliest pneumatic brake, acting on a principle analogous to the essential element of the atmospheric apparatus now favored in France, is that patented by Dalsyrmple Crawford, in 1845. In this a separate car carried a cylinder and piston, the former provided with a valve at one end to permit the pressure of the atmosphere against the latter when required. To the piston rod was attached a strong cord or chain, the opposite end of which was attached to a drum turned by a crank. By rotating the drum the piston was moved to expel the air, and the valve was then turned to exclude the air pressure upon the piston. This latter, by appropriate devices, was connected with the brakes, so that on turning the valve to admit the air, the piston was forced inward to actuate the brakes. In this class of apparatus, as in pneumatic railways, the substitution of compressed air pressure, as in the Westinghouse brake, for the vacuum used to induce atmospheric pressure, is a simple reversal of the operation, and that, moreover, any other fluid may be used in lieu of compressed air to transmit the power. The practicable power brakes may, therefore, be considered under the heads

of atmospheric, steam and hydrostatic brakes. Each of these is of sufficient importance to merit an article by itself, inasmuch as the English records before referred to, show, anterior to 1860, their latest date, no less than 32 pneumatic, 51 steam, and 20 hydrostatic brakes.

## Special Notices.

JUST PUBLISHED.

## Net Prices of Market Wire,

Giving in tabular form, the net prices of Iron Wire, in

SIXTY-THREE POUND BUNDLES, From No. 0 to No. 20,

AND IN TWELVE POUND STONES, From No. 16 to No. 36,

Twenty-One Different Discounts From List Price, viz:

(2½-7½-12½-17½-22½-27½-32½-37½-42½-47½-52½-57½-62½-67½-72½-77½-82½-87½-92½-97½-102½-107½-112½-117½-122½-127½-132½-137½-142½-147½-152½-157½-162½-167½-172½-177½-182½-187½-192½-197½-202½-207½-212½-217½-222½-227½-232½-237½-242½-247½-252½-257½-262½-267½-272½-277½-282½-287½-292½-297½-302½-307½-312½-317½-322½-327½-332½-337½-342½-347½-352½-357½-362½-367½-372½-377½-382½-387½-392½-397½-402½-407½-412½-417½-422½-427½-432½-437½-442½-447½-452½-457½-462½-467½-472½-477½-482½-487½-492½-497½-502½-507½-512½-517½-522½-527½-532½-537½-542½-547½-552½-557½-562½-567½-572½-577½-582½-587½-592½-597½-602½-607½-612½-617½-622½-627½-632½-637½-642½-647½-652½-657½-662½-667½-672½-677½-682½-687½-692½-697½-702½-707½-712½-717½-722½-727½-732½-737½-742½-747½-752½-757½-762½-767½-772½-777½-782½-787½-792½-797½-802½-807½-812½-817½-822½-827½-832½-837½-842½-847½-852½-857½-862½-867½-872½-877½-882½-887½-892½-897½-902½-907½-912½-917½-922½-927½-932½-937½-942½-947½-952½-957½-962½-967½-972½-977½-982½-987½-992½-997½-1002½-1007½-1012½-1017½-1022½-1027½-1032½-1037½-1042½-1047½-1052½-1057½-1062½-1067½-1072½-1077½-1082½-1087½-1092½-1097½-1102½-1107½-1112½-1117½-1122½-1127½-1132½-1137½-1142½-1147½-1152½-1157½-1162½-1167½-1172½-1177½-1182½-1187½-1192½-1197½-1202½-1207½-1212½-1217½-1222½-1227½-1232½-1237½-1242½-1247½-1252½-1257½-1262½-1267½-1272½-1277½-1282½-1287½-1292½-1297½-1302½-1307½-1312½-1317½-1322½-1327½-1332½-1337½-1342½-1347½-1352½-1357½-1362½-1367½-1372½-1377½-1382½-1387½-1392½-1397½-1402½-1407½-1412½-1417½-1422½-1427½-1432½-1437½-1442½-1447½-1452½-1457½-1462½-1467½-1472½-1477½-1482½-1487½-1492½-1497½-1502½-1507½-1512½-1517½-1522½-1527½-1532½-1537½-1542½-1547½-1552½-1557½-1562½-1567½-1572½-1577½-1582½-1587½-1592½-1597½-1602½-1607½-1612½-1617½-1622½-1627½-1632½-1637½-1642½-1647½-1652½-1657½-1662½-1667½-1672½-1677½-1682½-1687½-1692½-1697½-1702½-1707½-1712½-1717½-1722½-1727½-1732½-1737½-1742½-1747½-1752½-1757½-1762½-1767½-1772½-1777½-1782½-1787½-1792½-1797½-1802½-1807½-1812½-1817½-1822½-1827½-1832½-1837½-1842½-1847½-1852½-1857½-1862½-1867½-1872½-1877½-1882½-1887½-1892½-1897½-1902½-1907½-1912½-1917½-1922½-1927½-1932½-1937½-1942½-1947½-1952½-1957½-1962½-1967½-1972½-1977½-1982½-1987½-1992½-1997½-2002½-2007½-2012½-2017½-2022½-2027½-2032½-2037½-2042½-2047½-2052½-2057½-2062½-2067½-2072½-2077½-2082½-2087½-2092½-2097½-2102½-2107½-2112½-2117½-2122½-2127½-2132½-2137½-2142½-2147½-2152½-2157½-2162½-2167½-2172½-2177½-2182½-2187½-2192½-2197½-2202½-2207½-2212½-2217½-2222½-2227½-2232½-2237½-2242½-2247½-2252½-2257½-2262½-2267½-2272½-2277½-2282½-2287½-2292½-2297½-2302½-2307½-2312½-2317½-2322½-2327½-2332½-2337½-2342½-2347½-2352½-2357½-2362½-2367½-2372½-2377½-2382½-2387½-2392½-2397½-2402½-2407½-2412½-2417½-2422½-2427½-2432½-2437½-2442½-2447½-2452½-2457½-2462½-2467½-2472½-2477½-2482½-2487½-2492½-2497½-2502½-2507½-2512½-2517½-2522½-2527½-2532½-2537½-2542½-2547½-2552½-2557½-2562½-2567½-2572½-2577½-2582½-2587½-2592½-2597½-2602½-2607½-2612½-2617½-2622½-2627½-2632½-2637½-2642½-2647½-2652½-2657½-2662½-2667½-2672½-2677½-2682½-2687½-2692½-2697½-2702½-2707½-2712½-2717½-2722½-2727½-2732½-2737½-2742½-2747½-2752½-2757½-2762½-2767½-2772½-2777½-2782½-2787½-2792½-2797½-2802½-2807½-2812½-2817½-2822½-2827½-2832½-2837½-2842½-2847½-2852½-2857½-2862½-2867½-2872½-2877½-2882½-2887½-2892½-2897½-2902½-2907½-2912½-2917½-2922½-2927½-2932½-2937½-2942½-2947½-2952½-2957½-2962½-2967½-2972½-2977½-2982½-2987½-2992½-2997½-3002½-3007½-3012½-3017½-3022½-3027½-3032½-3037½-3042½-3047½-3052½-3057½-3062½-3067½-3072½-3077½-3082½-3087½-3092½-3097½-3102½-3107½-3112½-3117½-3122½-3127½-3132½-3137½-3142½-3147½-3152½-3157½-3162½-3167½-3172½-3177½-3182½-3187½-3192½-3197½-3202½-3207½-3212½-3217½-3222½-3227½-3232½-3237½-3242½-3247½-3252½-3257½-3262½-3267½-3272½-3277½-3282½-3287½-3292½-3297½-3302½-3307½-3312½-3317½-3322½-3327½-3332½-3337½-3342½-3347½-3352½-3357½-3362½-3367½-3372½-3377½-3382½-3387½-3392½-3397½-3402½-3407½-3412½-3417½-3422½-3427½-3432½-3437½-3442½-3447½-3452½-3457½-3462½-3467½-3472½-3477½-3482½-3487½-3492½-3497½-3502½-3507½-3512½-3517½-3522½-3527½-3532½-3537½-3542½-3547½-3552½-3557½-3562½-3567½-3572½-3577½-3582½-3587½-3592½-3597½-3602½-3607½-3612½-3617½-3622½-3627½-3632½-3637½-3642½-3647½-3652½-3657½-3662½-3667½-3672½-3677½-3682½-3687½-3692½-3697½-3702½-3707½-3712½-3717½-3722½-3727½-3732½-3737½-3742½-3747½-3752½-3757½-3762½-3767½-3772½-3777½-3782½-3787½-3792½-3797½-3802½-3807½-3812½-3817½-3822½-3827½-3832½-3837½-3842½-3847½-3852½-3857½-3862½-3867½-3872½-3877½-3882½-3887½-3892½-3897½-3902½-3907½-3912½-3917½-3922½-3927½-3932½-3937½-3942½-3947½-3952½-3957½-3962½-3967½-3972½-3977½-3982½-3987½-3992½-3997½-4002½-4007½-4012½-4017½-4022½-4027½-4032½-4037½-4042½-4047½-4052½-4057½-4062½-4067½-4072½-4077½-4082½-4087½-4092½-4097½-4102½-4107½-4112½-4117½-4122½-4127½-4132½-4137½-4142½-4147½-4152½-4157½-4162½-4167½-4172½-4177½-4182½-4187½-4192½-4197½-4202½-4207½-4212½-4217½-4222½-4227½-4232½-4237½-4242½-4247½-4252½-4257½-4262½-4267½-4272½-4277½-4282½-4287½-4292½-4297½-4302½-4307½-4312½-4317½-4322½-4327½-4332½-4337½-4342½-4347½-4352½-4357½-4362½-4367½-4372½-4377½-4382½-4387½-4392½-4397½-4402½-4407½-4412½-4417½-4422½-4427½-4432½-4437½-4442½-4447½-4452½-4457½-4462½-4467½-4472½-4477½-4482½-4487½-4492½-4497½-4502½-4507½-4512½-4517½-4522½-4527½-4532½-4537½-4542½-4547½-4552½-4557½-4562½-4567½-4572½-4577½-4582½-4587½-4592½-4597½-4602½-4607½-4612½-4617½-4622½-4627½-4632½-4637½-4642½-4647½-4652½-4657½-4662½-4667½-4672½-4677½-4682½-4687½-4692½-4697½-4702½-4707½-4712½-4717½-4722½-4727½-4732½-4737½-4742½-4747½-4752½-4757½-4762½-4767½-4772½-4777½-4782½-4787½-4792½-4797½-4802½-4807½-4812½-4817½-4822½-4827½-4832½-4837½-4842½-4847½-4852½-4857½-4862½-4867½-4872½-4877½-4882½-4887½-4892½-4897½-4902½-4907½-4912½-4917½-4922½-4927½-4932½-4937½-4942½-4947½-4952½-4957½-4962½-4967½-4972½-4977½-4982½-4987½-4992½-4997½-5002½-5007½-5012½-5017½-5022½-5027½-5032½-5037½-5042½-5047½-5052½-5057½-5062½-5067½-5072½-5077½-5082½-5087½-5092½-5097½-5102½-5107½-5112½-5117½-5122½-5127½-5132½-5137½-5142½-5147½-5152½-5157½-5162½-5167½-5172½-5177½-5182½-5187½-5192½-5197½-5202½-5207½-5212½-5217½-5222½-5227½-5232½-5237½-5242½-5247½-5252½-5257½-5262½-5267½-5272½-5277½-5282½-5287½-5292½-5297½-5302½-5307½-5312½-5317½-5322½-5327½-5332½-5337½-5342½-5347½-5352½-5357½-5362½-5367½-5372½-5377½-5382½-5387½-5392½-5397½-5402½-5407½-5412½-5417½-5422½-5427½-5432½-5437½-5442½-5447½-5452½-5457½-5462½-5467½-5472½-5477½-5482½-5487½-5492½-5497½-5502½-5507½-5512½-5517½-5522½-5527½-5532½-5537½-5542½-5547½-5552½-5557½-5562½-5567½-5572½-5577½-5582½-5587½-5592½-5597½-5602½-5607½-5612½-5617½-5622½-5627½-5632½-5637½-5642½-5647½-5652½-5657½-5662½-5667½-5672½-5677½-5682½-5687½-5692½-5697½-5702½-5707½-5712½-5717½-5722½-5727½-5732½-5737½-5742½-5747½-5752½-5757½-5762½-5767½-5772½-5777½-5782½-5787½-5792½-5797½-5802½-5807½-5812½-5817½-5822½-5827½-5832½-5837½-5842½-5847½-5852½-5857½-5862½-5867½-5872½-5877½-5882½-5887½-5892½-5897½-5902½-5907½-5912½-5917½-5922½-5927½-5932½-5937½-5942½-5947½-5952½-5957½-5962½-5967½-5972½-5977½-5982½-5987½-5992½-5997½-6002½-6007½-6012½-6017½-6022½-6027½-6032½-6037½-6042½-6047½-6052½-6057½-6062½-6067½-6072½-6077½-6082½-6087½-6092½-6097½-6102½-6107½-6112½-6117½-6122½-6127½-6132½-6137½-6142½-6147½-6152½-6157½-6162½-6167½-6172½-6177½-6182½-6187½-6192½-6197½-6202½-6207½-6212½-6217½-6222½-6227½-6232½-6237½-6242½-6247½-6252½-6257½-6262½-6267½-6272½-6277½-6282½-6287½-6292½-6297½-6302½-6307½-6312½-6317½-6322½-6327½-6332½-6337½-6342½-6347½-6352½-6357½-6362½-6367½-6372½-6377½-6382½-6387½-6392½-6397½-6402½-6407½-6412½-6417½-6422½-6427½-6432½-6437½-6442½-6447½-6452½-6457½-6462½-6467½-6472½-6477½-6482½-6487½-6492½-6497½-6502½-6507½-6512½-6517½-6522½-6527½-6532½-6537½-6542½-6547½-6552½-6557½-6562½-6567½-6572½-6577½-6582½-6587½-6592½-6597½-6602½-6607½-6612½-6617½-6622½-6627½-6632½-6637½-6642½-6647½-6652½-6657½-6662½-6667½-6672½-6677½-6682½-6687½-6692½-6697½-6702½-6707½-6712½-6717½-6722½-6727½-6732½-6737½-6742½-6747½-6752½-6757½-6762½-6767½-6772½-6777½-6782½-6787½-6792½-6797½-6802½-6807½-6812½-6817½-6822½-6827½-6832½-6837½-6842½-6847½-6852½-6857½-6862½-6867½-6872½-6877½-6882½-6887½-6892½-6897½-6902½-6907½-6912½-6917½-6922½-6927½-6932½-6937½-6942½-6947½-6952½-6957½-6962½-6967½-6972½-6977½-6982½-6987½-6992½-6997½-7002½-7007½-7012½-7017½-7022½-7027½-7032½-7037½-7042½-7047½-7052½-7057½-7062½-7067½-7072½-7077½-7082½-7087½-7092½-7097½-7102½-7107½-7112½-7117½-7122½-7127½-7132½-7137½-7142½-7147½-7152½-7157½-7162½-7167½-7172½-7177½-7182½-7187½-7192½-7197½-7202½-7207½-7212½-7217½-7222½-7227½-7232½-7237½-7242½-7247½-7252½-7257½-7262½-7267½-7272½-7277½-7282½-7287½-7292½-7297½-7302½-7307½-7312½-7317½-7322½-7327½-7332½-7337½-7342½-7347½-7352½-7357½-7362½-7367½-7372½-7377½-7382½-7387½-7392½-7397½-7402½-7407½-7412½-7417½-7422½-7427½-7432½-7437½-7442½-7447½-7452½-7457½-7462½-7467½-7472½-7477½-7482½-7487½-7492½-7497½-7502½-7507½-7512½-7517½-7522½-7527½-7532½-7537½-7542½-7547½-7552½-7557½-7562½-7567½-7572½-7577½-7582½-7587½-7592½-7597½-7602½-7607½-7612½-7617½-7622½-7627½-7632½-7637½-7642½-7647½-7652½-7657½-7662½-7667½-7672½-7677½-7682½-7687½-7692½-7697½-7702½-7707½-7712½-7717½-7722½-7727½-7732½-7737½-7742½-7747½-7752½-7757½-7762½-7767½-7772½-7777½-7782½-7787½-7792½-7797½-7802½-7807½-7812½-7817½-7822½-7827½-7832½-7837½-7842½-7847½-7852½-7857½-7862½-7867½-7872½-7877½-7882½-7887½-7892½-7897½-7902½-7907½-7912½-7917½-7922½-7927½-7932½-7937½-7942½-7947½-7952½-7957½-7962½-7967½-7972½-7977½-7982½-7987½-7992½-7997½-8002½-8007½-8012½-8017½-8022½-8027½-8032½-8037½-8042½-8047½-8052½-8057½-8062½-8067½-8072½-8077½-8082½-8087½-8092½-8097½-8102½-8107½-8112½-8117½-8122½-8127½-8132½-8137½-8142½-8147½-8152½-8157½-8162½-8167½-8172½-8177½-8182½-8187½-8192½-8197½-8202½-8207½-8212½-8217½-8222½-8227½-8232½-8237½-8242½-8247½-8252½-8257½-8262½-8267½-8272½-8277½-8282½-8287½-8292½-8297½-8302½-8307½-8312½-8317½-8322½-8327½-8332½-8337½-8342½-8347½-8352½-8357½-8362½-8367½-8372½-8377½-8382½-8387½-8392½-8397½-8402½-8407½-8412½-8417½-8422½-8427½-8432½-8437½-8442½-8447½-8452½-8457½-8462



# Trade Report.

Office of THE IRON AGE,  
WEDNESDAY EVENING, July 23, 1873.

The chief features of the past week have been a strong market for all classes of securities. The foreign money markets have been easy, the Bank of England rate having been reduced early in the week to 4½ per cent., while money outside of the bank was obtainable at still better rates. In our own market money has been easily obtainable on call at 3 @ 4 per cent., and on long time, say to the end of the year, at 7 per cent. First-class mercantile paper has ranged from 5½ to 7½ per cent., according to dates.

The manipulations of a clique have strengthened gold, and the price has been as high as 110½. Foreign exchange has ruled, for the most part, above the point at which gold could be exported, and accordingly the specie shipment has been heavy.

The following table shows the course of the gold market during the past week:

	Highest.	Lowest.
Thursday	110½	110½
Friday	110½	110½
Saturday	110½	110½
Sunday	110½	110½
Monday	110½	110½
Tuesday	110½	110½
Wednesday	110½	110½

The most active stocks have been Western Union Telegraph, Lake Shore, Union Pacific, Northwestern, Ohio, Erie, and C. & I. C. In Erie a sharp corner was developed on Saturday, and has since continued. The price has been up as high as 65½, but the arrival of some stock by steamer put the price back a shade at the close. Express and miscellaneous shares have been dull.

The bond market has been strong and fairly active. Southern securities have been actively dealt in, and are also strong. Railway mortgages continue to be the favorites for investors.

EXPORTS OF SPECIE.

Total for the week	\$4,944,534
Previously reported	\$3,997,318

Total since January 1, 1873. \$35,941,862

IMPORTS.

1871.	1872.	1873.	
Tot. for week.	\$6,094,317	\$7,281,202	\$6,583,355
Prev. reported.	\$6,274,118	\$7,320,586	\$7,047,911

Since Jan 1. \$211,368,429 \$244,502,188 \$233,178,298

Included in the imports of general merchandise for the week are:

	Quant.	Value.
Anvils	100	\$1,230
Brass goods	26	\$1,113
Bronzes	3	\$4,080
Chains and anchors	106	\$3,587
Copper	3	\$4,744
Cutlery	136	\$7,744
Guns	317	\$1,906
Hardware	91	\$5,558
Iron, pig, tons	16	\$1,619
Iron, hoop, tons	1,125	\$1,825
Iron, sheet, tons	156	\$1,727
R. R. bars	3,550	\$5,821
Iron cotton ties	544	\$2,076
Iron tubes	1,725	\$4,889
Iron, other, tons	418	\$3,533
Lead, pigs	1,179	\$5,029
Metal goods	107	\$7,406
Nails	65	\$1,153
Needles	31	\$6,342
Old metal	3	\$68
Platina	3	\$3,389
Per. caps	13	\$1,841
Saddlery	9	\$1,537
Steel	4,935	\$7,062
Spelter	225,000	\$15,511
Silverware	4	\$1,951
Tin, boxes	26,564	\$26,025
Tin, 2071 slabs	114,389	\$4,617
Wire	630	\$6,865
Zinc	114,064	\$6,863

The bank statement, owing to the loss of \$2,384,400 specie during the week, shows a reduction in the total reserve of \$1,841,500. The total liabilities have increased \$1,179,300, and the banks hold \$2,161,000 less of what is reckoned as lawful money in excess of a 25 per cent. reserve than last week. The banks, it will be noticed, hold \$542,600 more legal tenders than last week. The percentage of reserve to liabilities held by the national banks is 30-87, and by the state banks, which are under no restrictions as to reserve, 26-62, making the average of both classes 30-34 per cent. The following is a comparison of the averages of the past two weeks:

	July 12.	July 19.	Differences.
Loans	\$284,574,500	\$289,578,100	Inc. \$5,003,600
Specie	\$4,628,000	\$3,273,800	Dec. \$1,354,200
Circulation	\$7,291,900	\$7,281,500	Dec. 10,400
Deposits	\$28,916,900	\$40,206,400	Inc. \$11,289,500
Leg. Ten.	\$45,329,900	\$45,873,500	Inc. \$543,600

Government bonds closed strong at the following quotations:

	Bid.	Asked.
U. S. Currency 6s.	114½	114½
U. S. 6s, 1881, reg.	118½	118½
U. S. 6s, 1881, c.	120	120½
U. S. 6s, 5-20 reg. May and Nov.	116½	117
U. S. 6-80 1884, c.	117½	118
U. S. 5-20 1865, c.	119½	119½
U. S. 5-20 1867, r. Jan. and July.	117	117½
U. S. 5-20 1865, c.	118½	118½
U. S. 5-20 c. 1867	119	119½
U. S. 5-20 c. 1868	118½	118½
U. S. 10-40 rec.	114½	115½
U. S. 10-40 c.	115½	115½
U. S. 5s 1881 cou.	115½	116

The following were the highest and lowest prices of stocks to-day:

	Highest.	Lowest.
N. Y. Cen. & Hudson Consolidated	104½	104½
Lake Shore	93½	93½
Rock Island	111	110½
Del. Lack and Western	100½	100½
Wabash	73½	73½
Harlem	129	129
Western Union Telegraph	91	90½
Norfolk and W. Va.	69½	69½
Milwaukee & St. Paul	53½	53½
Panama	115	115
Pacific Mail	37½	37½
Erie	61½	61½
Ohio & Mississippi	40½	39½
Boston, Hartford & Erie	3	2½
Union Pacific	28½	28½
C. & I. C.	38½	38½
Hannibal and St. Joseph	40½	39
Consolidated Coal	56½	55½
Maryland Coal	56	55
U. S. Express	71½	71½

Some time since, the Canadian Bank of Commerce, having a capital and surplus of \$7,500,000, established an agency in this city in Exchange Place. Their business has increased so rapidly as to require more room, and the agency has recently removed into the spacious office No. 50 Wall street, in the elegant new white marble building next to the Bank of New York. The agency is under the management of Messrs. J. G. Harper and J. H. Goadby, and their advertisement will be found in our columns.

## GENERAL HARDWARE.

There is little improvement in the demand for General Hardware this week over last, although some Western buyers have made their appearance, but as yet we hear of few large orders being placed. The most important feature of the week is the reduction in prices of Cast Butts. The New England Butt Co., under date of 21st instant, issue a circular giving the following prices:

Wire Narrow and Broad Joint Butts	dis 35 c.
Common	dis 40 c.
Narrow and Broad Loose Joint Butts	dis 50 c.
Parliament Butts and Mayer's Hinges	dis 40 c.
Parties whose net orders for Butts alone amount to \$500, or more, for each six months ending June 30th and December 31st of each year, will be entitled to a discount of 5 per cent. on net.	

CAST BUTT HINGES.

Sad Irons	5½ c. per lb.
Dumb Bells	5 c.
Butterworth's Window Springs, No. 1	\$16 gross.
7/11 other miscellaneous goods	10 per cent. above list prices.

The following are the Union Mfg. Co.'s reduced prices for Cast Butts:

Drilled and Wire Jointed Fast	dis 35 c.
Drilled and Wire Jointed Loose	dis 45 c.
And "quantity" discount	5 c.
Drilled Loose Joint, Plain, Acorn Tip	dis 35 c.
Drilled Loose Joint, Jap'd and Acorn	dis 35 c.
Drilled Loose Joint, Jap'd and Serrated Acorn	dis 35 c.
And "quantity" discount	10 c.

The demand for foreign Hardware continues light, and we hear of few changes worthy of notice. Coll Chain has been reduced 6d per cwt. in England, but the price here remains as before. Trace Chains also declined ½d per pair, but we hear of no weakening in this market. We quote ½ Coll Chain at 8½ c. @ 9c., gold, according to quantity, and 6½-10-2 Traces, 62½ c. @ 65c., gold. These figures represent small and medium lots, and in the case of a large order could possibly be shaded a trifle. A rumor that English Fish have advanced 5 per cent. on the other side has had no effect on prices here.

There is a fair seasonal demand for Nails, and prices remain unchanged. We quote small lots at the card rate, viz.: \$4-75, net. Lots of 100 kegs and upward at \$4-65, with \$4-50 the extreme figure for largest orders. We mentioned last week that at the extreme figure there was a manifest disposition on the part of manufacturers to decline large orders for future delivery. This feeling has gained strength with in the past week.

The Russell & Erwin Mfg. Co. issue, under date of July 15th, a circular giving the following changes in prices and list of new goods:

CHANGE LIST PRICE OF THE FOLLOWING GOODS.					
No. of Lock.	Page of 1871 List.	Price per doz.	No. of Lock.	Page of 1871 List.	Price per doz.
0	73	\$3 50	615	22	\$3 90
0 1/4	73	4 38	666	23	2 90
0 1/2	73	4 18	619	23	4 20
0 3/4	73	5 00	612 1/2	23	3 35
300	71	4 15	800	2	4 00
301	71	5 00	801	2	4 80
302	71	5 00	860	18	5 00
303	71	5 85	1300 1/2	18	7 75
557	30	2 10	1261	18	6 60
604	22	2 10	1261 1/2	18	6 75
DOOR KNOBS.					
Page 169.					
Nos.		per doz.	Nos.		per doz.
303	23	\$1 30	310	308	1 90
304	23	6 25	410		
Closet Knobs same price as Door Knobs.					

Closest Knobs same price as Door Knobs.

NEW LOCKS.

No.	Page	Price	No.	Page	Price
285, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00	285, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00
286, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00	286, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00
287, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00	287, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00
288, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00	288, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00
289, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00	289, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00
290, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00	290, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00
291, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00	291, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00
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295, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00	295, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00
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298, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00	298, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00
299, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00	299, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00
300, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00	300, 4x3 in. Reversible Mortise Knob Lock	73	\$12.00

Patent Steel Key, 24 changes.

No. 1015, 4x3 in. Villa Mortise Knob Lock

No. 1016, 4x3 in. Villa Mortise Knob Lock

No. 1017, 4x3 in. Villa Mortise Knob Lock

No. 1018, 4x3 in. Villa Mortise Knob Lock

No. 1019, 4x3 in. Villa Mortise Knob Lock

No. 1020, 4x3 in. Villa Mortise Knob Lock

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No. 1060, 4x3 in. Villa Mortise Knob Lock

No. 1061, 4x3 in. Villa Mortise Knob Lock



holders of English refuse to sell at less than \$35. Buyers lack confidence in the future course of the market, and buy in a small way only. The demand for pig iron is light. Prices of Scotch are weak, on account of the decline in New York, caused largely by the fact that the steamers are bringing it as ballast, and are able to sell it at a low figure. American is quiet and a shade lower. We quote yard lots of American pig iron at \$35 to \$36 per ton, including No. 3 extra at \$35 to \$36, and No. 1 at \$34 to \$35. We quote Ellington at \$37 to \$39, Colchester at \$38 to \$39, Garscherie at \$36 to \$37, Charcoal at \$60 to \$70.—*Com. Bulletin.*

## CHICAGO.

CHICAGO, July 17.—*Hardware.*—The market during the past week has been quiet, as is usual this season of the year. Foreign goods dull and unchanged. Iron.—There has been a recent decline in Merchant Iron (Pittsburgh classification); is selling at \$4 and 4-10 rates. Cut Ails are dull, and selling at \$4 75 rates, and 12-1/2¢ off in 100 lbs. Pig Iron is quiet and weak for foreign and American varieties.—*For. of Com.*

## CLEVELAND.

Messrs. HENDRICKSON & ADAMS, under date of July 21, write us as follows: There seems to be a better feeling in the Pig Iron market, although it is more of a prospective nature than a present realization. Prices have not advanced up to this writing, but there is a better feeling in the market, and sales being made to be active. Many dealers are expecting a very heavy fall business, and it seems much more of a necessity from the fact that up to this time we have had no spring trade. In Lake Superior Charcoal, for steel and foundry purposes, there has been a perceptible falling off in prices, especially for large sales. The same for Car Wheel and Malleable use are in demand, though not as urgent as a fortnight ago. But many foundry men are quiet, sales being made only in small quantities at from \$44 to \$46. Mill Irons are in better request, though some offers are noted in large quantities at figures much below present cost of manufacture. At present there is nothing doing in Scotch brands, except in small lots to supply immediate wants. Prices range from \$51 to \$53. Quotations are nominally as follows:

LAKE SUPERIOR CHARCOAL FOR CAR WHEELS AND MALLEABLE USE.	
No. 1.....	\$ 57 50—4 m.
No. 2.....	\$ 57 50—4 m.
No. 3.....	\$ 57 50—4 m.
No. 4.....	\$ 57 50—4 m.
No. 5.....	\$ 57 50—4 m.

COLD BLAST CHARCOAL.	
No. 1 Tennessee.....	\$ 50 50—4 m.

ANTHRACITE.	
No. 1 Onondaga.....	\$ 43 50—4 m.

BIRMINGHAM IRON FROM ALL LAKE SUPERIOR ORES.	
No. 1 Under, according to brand.....	\$ 45 50—4 m.
No. 2.....	\$ 45 50—4 m.
Gray Forge.....	\$ 45 50—4 m.

BLACKLAND IRON FROM WAREHOUSE—SCOTCH.	
No. 1 Glenbrook.....	\$ 55 50—4 m.
No. 1 Ellington.....	\$ 55 50—4 m.
No. 1 Ayreson.....	\$ 55 50—4 m.

AMERICAN.	
No. 1 Massillon.....	\$ 50 50—4 m.
No. 1 Volcano.....	\$ 50 50—4 m.

IRON ORES.	
Lake Superior specular.....	\$10 50
Furnace.....	9 50

## BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, corner of South Charles and Lombard streets, report us the following prices, under date of July 22, 1873: The market remains about as reported last week. Prices are weak and drooping, though with improved demand. More firmness in quotations figures is shortly anticipated.

AMERICAN REFINED BAR IRON.

11-6 wide by 1/2 to 1 thick..... 4c. to 4-1/2c. per lb. Round and square, ordinary sizes, from 1 1/2 to 3 inclusive..... 4c. to 4-1/2c. Flat iron, 1 1/2 wide by 1/2 thick..... 3 1/2c. per lb. Flat iron, from 1 1/2 to 3 wide by 1/2 thick..... 3 1/2c. per lb. These Scotch Iron 1 1/2 to 1 wide by 1/2 thick..... 3 1/2c. per lb. Thick..... 3 1/2c. per lb. New York Nail Rods..... 5 1/2c. to 5 3/4c. Buck Diamond Cast..... 17c. to 18c. and Octagon, ordinary sizes..... 17c. to 18c. Cast Spring Steel..... 11c. to 12c. Homogeneous Steel Plate..... 13c. to 14c. Forster's Horse Shoes, per pair of 100 lbs..... \$7 37 1/2 Mule Shoes..... 73 1/2c. Common Horse Nails, from 1c. to 1 1/2c. per pound.

Pittman Horse Nails, 2 1/2 to 3 1/2c. per lb. R. B. Spikes..... 5 1/2c. by 9-16 at 4 1/2c. to 5c. per lb.

## FOREIGN.

## GREAT BRITAIN.

Messrs. J. Berger Spence & Co., London, Glasgow and Manchester, under date of July 5, 1873, report: "Metal."—This market does not show any symptom of improvement, the demand continues sluggish, and the high prices maintained for raw material and labor preclude the possibility of any considerable reduction in the finished article. There is not much change, or the view of consumers undergo a material change, there does not appear much probability of any permanent improvement taking place, more especially in the iron branch of our trade. There is a little variation in the value of Scotch pig iron warrants; the shipments for the past week again show a decrease, and for the six months ending the 25th June last total up to 330,535 tons, against 408,000 tons in 1872, and 375,950 tons in the same period of 1871. The quarterly meeting held this week at Middleborough was fairly attended, but the business transacted was very small. The announcement of a reduction varying from 30 to 40 per cent made by one of the first ironmasters in South Staffordshire is hoped will brighten the prospects of trade at the meetings to be held during next week in Wolverhampton and Birmingham. Copper is dull, but for Chile and English tough and manufactured. The stock of Chilean and Bolivian products is estimated at about 22,500 tons in Liverpool and Swansea, against 15,000 tons at this time last year. There is no alteration in Tin. For Lead the demand continues fair, without change in prices. There is not much doing in Spelter, and some parcels of remelted are being pressed for sale.

IRON.—Ayrshire—Yorkshire Pig Iron, No. 1, 11 1/2c. to 12 1/2c.; No. 2, 11 1/2c. to 12 1/2c.; (Foundry), 11 1/2c. to 12 1/2c.; No. 4 (Forge), 11 1/2c. net cash, or 2 extra 4 months' bills. Scotch Pig, warrants, 10s. to 1 1/2c. Staffordshire Bars, 12 1/2c. to 14c. Hoop Iron, 14c. to 15c. Gas Tubes, 40 per cent. off new list. Better Tubes, 10 per cent. premium.

COPPER.—English Tough Ingots, 23s. to 23s. 6d. Chili Bars, 23s. to 23s. 6d.

TIN.—English Ingot, 113s. to 114s. Straits, 113s. to 114s.

LEAD.—Best Cast, I. C., 34s. to 35s.; to Charcoal, I. C., 40s. to 41s. per box.

RED LEAD.—Best, 25s. to 26s.

ANTIMONY.—French Star, 25s. to 26s.

SILVER.—Silesian Special Brands, 23s. to 24s. English, East Brands, 23s. to 24s.

## GERMANY.

(Frankfurt Zeitung.)

DORTMUND, June 28, 1873.—A most active business has again been transacting in coal, and the sales of "future" are making at high prices, all the way to the end of the current year. Thus Coal for rolling is sold at 2 1/2 to 3 shillings on the spot; Coal for steam at 2 1/2 to 3 shillings; Lump Coal at 3s. to 3s. 6d.; Cracked Coal, delivered on the bank, at 2s. 6d. to 3s. 6d.; all the 100 cwt. The call for Coal is now being satisfied without any further change in value.

(Borussia.)

HAMBURG, July 4, 1873.—Lead has remained unchanged. The offerings were light; German at 24 1/2 to 25 shillings; English at 25 to 26 shillings; Spanish at 27 shillings. Copper is firm, although the dealers are in a small way for local consumption only; Northern Sorts, 96 shillings; Old Sheffield, 19 shillings; currency, 96 shillings; the same relates to 7 1/2 to 8 marks; Banca and English, and Rods 1 1/2 to 1 3/4. Nothing transacting in Spelter, which is nominally quotable 7 1/2 marks.

## HOLLAND.

(Kock & Vliedboom.)

ROTTERDAM, July 1, 1873.—Tin is firm, but quiet, Banca has been sold on the spot from 82 to 83 1/2

guilder, and to arrive from the first flat auction at 82 1/2 to 83 1/2. Stock of Banca on warrant a 150,708 slabs, against 66,539 in 1872; stock of Billiton on ditto 100 slabs, against none in 1872. Deliveries during the six months, 72,119 slabs Banca, and 1831 Billiton, against 51,755 and 2608 in 1872. Afloat for Holland from Banca 15,900 piculs, against 10,800 in 1872. Stock of Billiton in first hands, private, here, 5503 slabs, and at Amsterdam 7150, together 12,653.

ROTTERDAM, July 8, 1873.—Tin.—On passing in review the various articles at the close of the first six months of the year, we find that Banca Tin, from 8 1/2 guilders on the 1st of January, has declined to 7 1/2. With few exceptions the movement in the value of leading staples has been downward this far in 1873, which, from all appearances, is a year of reverse reaction from a too rapid advance. It is to be hoped that the decline may give us a sound basis for trade to revive upon. Little inclination is shown to deal in Tin, and spot sales continue to be made of Banca at 7 1/2, and at 7 1/2 to 7 3/4 guilders from the first autumn auction.

## FRANCE.

## (L. Fleury.)

HAVRE, June 30, 1873.—Copper.—Chill.—The month of June has brought us no amelioration, and nothing transpiring. In England fluctuations have been trifling, between 283 and 281 for current brands, the latter figure at the close. French manufacturers continue buying in England, there being no sellers at current figures at Havre. The arrivals here have been, during the month, 8543 bars and 2933 bars Corcoro, 1899 bars of them via Bordeaux, and 274 bars direct. Of other descriptions of Copper we have received 26,104 ingots, 13,154 of which direct from Spain, and 341 cases from Japan via Marseilles. Of Old Copper the arrivals have been 19,000 kilos, paid off; the balance is held too high. Lead.—There have been sold 30 tons Spanish at 59 1/2 francs, but there are no more buyers at present at this high price. Arrivals, 10,971 pigs. Spelter and Tin.—There have been received in transit 150 tons Spelter in slabs, 10 tons Old Spelter and 1501 slabs Tin. Stock of Copper tone realises 1000 May 31, 1873, and 470 June 30, 1873. I quote Minnesota Copper 365 to 370 francs, duty paid, the 100 kilos, nominally; other Lake Superior, 355 to 360, and Baltimore, 340 to 345; Chili, 315 to 320; Old Copper, 215; Yellow Metal, 125 to 130; Sheathing, 125 to 135; Bronze, 160 to 200; Spelter, 72 to 73; Banca Tin, 375 to 380; Straits, 370; Peruvian, 370 to 380; Lead, 55 to 56 1/2 francs, with all 1/4 per cent. discount, except Old Copper, which is 1/4 per cent. discount.

## (Le Commerce.)

PARIS, July 3, 1873.—Iron.—While our Iron industry is in hopes of eventually drawing some advantage from the duty modifications in Germany, notwithstanding the non-admittance free of duty of machinery and tools, we continue in a state of complete stagnation, whatever door being merely to satisfy urgent local wants. In the Champagne an insignificant business is done in Charcoal Iron at 180 francs the ton. All sorts of Iron are sustained in value, nominally at least. Foundries are doing very little and those that have some show of activity displayed, work for railway equipment solely. No orders in the Meurthe and Moselle, where quotations are irregular. A good many new forces are springing up in that region, never before. In the Meurthe of 50 to 50 tons daily. The Ardennes district also complains.

## (Monteur des Interests Matériels.)

PARIS, July 6, 1873.—Metals.—The month of June has been one of general decline in this branch. Tin, after some ups and downs during the month, winds up at about the same figure of its opening. The Dutch official monthly and semi-annual statistics are to hand, and show that the deliveries are satisfactory. As for the stock, although large, it need not frighten us, as the Dutch trading houses sell no more than what is engaged to do, 3,000 slabs each sale; the surplus supply might as well be in the island of Banca. Copper closes at Marseilles, 235 francs for Spanish, and at 225 for Chili and Peruvian; Sheathing, 125 to 130; Banca Tin, 375 to 380; Straits, 370; Peruvian, 370 to 380; Lead, 55 to 56 1/2 francs, with all 1/4 per cent. discount, except Old Copper, which is 1/4 per cent. discount.

## (Le Commerce.)

PARIS, July 10, 1873.—Iron.—The general dullness continues, and there is absolutely no change. In the Champagne some forces are now being put on the orders that were still pending, simply extinguishing their fires. The quotation for Pig in the Meurthe and Moselle is 187 1/2 francs. At Paris, Charcoal Iron commands 355 to 370; Coke, 355 to 380; Roller Iron, 325 to 330; and Sheet, 425 to 430. Export of Iron from France during the first five months, 95,629 tons, against 91,610 last year. Import, 45,103, against 71,944.

## BELGIUM.

## (Le Commerce.)

BRUSSELS, July 3, 1873.—Iron.—In Belgium the iron trade is slightly looking up, especially so far as the manufacture of rails is concerned. Thus the Cockerill Establishment, at Liege, received a large foreign order for them at paying rates. Nos. 1, 2 and 3 Wrought Iron are, meanwhile, 280, 280 and 310 francs; Nos. 2, 3 and 4 Sheet Iron, 440, 420 and 500 francs, all per week at 125 francs. At Charleroi, at Charleroi foreign Rail orders have also dropped in, to some extent, and 300 francs is now insisted upon. Wrought Iron there, nominally 300 francs. Sheet iron and special rates in better request, but no general improvement apparently yet at hand.

## (Cote Libre.)

BRUSSELS, July 9, 1873.—In Belgium it cannot be denied that a slight looking up is perceptible, principally bearing upon Rails. Large quantities in receipt of orders at 301 francs per ton. Wrought Iron commands 300; No. 1 Pig, 140; at Charleroi, station price prevails at 290 to 295 Wrought, and 400 to 420 in Plates, for building and boilers.

## EAST INDIES.

## (Ernsthausen &amp; Oesterley.)

CALCUTTA, July 8, 1873.—Telegraphic.—Copper—English tin, 35 1/4 paces; Spelter, red Silesian, 10s.; copper, hard quality 7s. and Yellow Metal, 3s. Exchange, 1/10 15-16 to 1/11.

## WEST INDIES.

## (J. &amp; Ch. Borde.)

SAINT PIERRE (Martinique), July 9, 1873.—The import market has, on the whole, been weak and declining during the first six months of the year, mainly due to the telegraph orders being sent out daily to replace goods that may have been selling, and, as a rule, every man in France, or elsewhere, receiving such an order, is under the erroneous impression that the market can stand a trifle more, and he little on his own account. The consequence is that we receive about twice as much as the colony can stand. Eventually, we shall have to return to the old system of ordering by mail. On Coal 240 tons arrive just from the United States, and a great demand for Newcastle (England) Coal. Exchange on Paris, 90 to 120 days, 3 to 1 per cent. premium bank rate; private bills, par.

## SOUTH AMERICA.

## (H. Fischer &amp; Co.)

VALPARAISO, (Chili), June 13, 1873.—Copper in Bars.—During the early part of the month some transactions took place at \$17 90 at Coquimbo, and at \$18, cash, on shore here, freight secured; and of Urmeneta, 250 tons sold at \$18 15 per quintal, cash, on board steamer. Since receipt of late dull English accounts, buyers do not feel disposed to go on at these rates, and nothing could be placed now above \$17 1/2, cash, on shore here, provided purchasers had the freight secured. There are offerings from Urmeneta 300 tons per steamer, at \$18, cash, but buyers will not take more than \$17 1/2, cash, with the clause that payment be not made till receipt of bills of lading. Sales, 0,871 quintals, at \$17 90 to \$18 15. No sales of either Regular or Old. We quote Bars, with 50 freight, \$17 1/2 to \$18; Regulars, \$17 1/2 to \$18; and Old, \$17 1/2 to \$18. Freight, 45% to 46, to the dollar; 90 days, 46 to 46 1/2. P. S.—While dispatching the mails, we still hear of a sale of Copper in bars of 3210 quintals at \$17 90, on board of Guayacan, with 50 freight per steamer.

## (Sundbach, Parker &amp; Co.)

DEMERAARA (British Guiana), July 7, 1873.—Iron Hope are steady at 4c.—duty 10c. per cwt. Import in 1873, 8920 cwt. from Jan. 1, 1873, to date, 3612 cwt. We quote Roman Cement \$20 per barrel; Portland, \$24—duty 5 per cent. ad valorem. Coal.—The demand continues limited; sales, ex. ship, for loose, \$12 per ton; hogheads, \$13, ex. store. Duty 56c. per ton and 24c. per hoghead. Exchange, 90 to 90 days, \$1 1/2 to \$1 3/4. The 2 sterling. Trade in general is dull; tonnage is scarce.

## CHINA.

## (Arnhold, Karberg &amp; Co.)

HONG KONG, June 6, 1873.—Metals.—Nail rods.—The hands of importers have been materially strengthened during the fortnight by advices from Yokohama, reporting an active market at higher prices. The inquiry has been constant and regular, and closing rates show an improvement of about 5 cents. Best assortments being saleable at \$4 1/4 per cwt. Bar Iron continues difficult to move, and prices are weaker. Sort Bars have again been asked for, but stocks are small and the offers made have failed to secure them. Hoops have been dealt in to the extent of 460 piculs, at \$1 1/2 per picul. Iron Wire is firmly held, but no sales are reported. Steel has not attracted much notice, the only transaction of the past fortnight being 5 1/2 boxes "small sizes," at \$5 30 per picul. In Lead an extensive business has again been transacted at advancing prices. For L. B. \$7 to \$7 20 above the ruling rates, while W. B. has realized \$7 30 per picul. At the close, however, there is a quieter feeling, and prices, if anything, are a shade easier. Tin Plates have continued to attract attention and commanded full rates, sales having been made at \$10 to \$10 1/2 per box, but the market closes quieter, large prospective receipts having made the natives somewhat cautious. Tin quiet and weak. Quicksilver is quoted \$1 per picul higher, and readily saleable. Yellow Metal is held for higher prices. Coal, weak and declining under heavy arrivals, present and prospective. Cardiff, \$14 1/2; English, \$11 1/2 to \$12, asked. Exchange, 6 months, 6 1/2 to 6 1/4, at Shanghai, and 4 1/2 to 4 1/4 at Hong Kong.

## Our English Letter.

## Review of the British Iron, Hardware, and Metal Trades.

## (From our Regular Correspondent.)

SHEFFIELD, Eng., July 7, 1873.

In a late dated postscript to my last week's letter I stated that a considerable reduction had taken place in Staffordshire finished iron, and added that the reduction was believed to presage a general fall in prices, either at or previous to the quarterly meetings. The great importance of the subject must now be my apology for the extreme length at which I shall be compelled to remark upon and give details of it—premising that at no time prior to the last week or so do I recollect so many allusions to "American competition" by the press of this country as during that brief period. In the beginning of last week, and since then, circulars have been issued by Messrs. J. Bradley & Co., Messrs. G. B. Thornycroft & Co., Messrs. Bagnall & Sons (limited), Philip Williams & Son, The Hope Iron Co., Earl Dudley, Messrs. Barrows, and, indeed, most of the leading Staffordshire firms, announcing reductions of various amounts in bars, plates and sheets. Messrs. Bradley's bars are now £14—a fall of £2—and their sheets are £2 10 lower. Earl Dudley and Messrs. Barrows notify a fall of £2 in bars, which are, therefore, quoted £14 12 6, with a proportionate drop in other descriptions, the latter firm now quoting as follows: "Crown B. B. H. bars, £14; ditto Bloomsfield plates, £17; ditto best ditto ditto, £18; best best ditto, £19; B. B. H. sheets, £17; best ditto, £18 10; best best ditto, £19 10; B. B. H. hoops, £15 10; ditto strips, £16 10; ditto best angle iron, £16 per ton at the works—all other descriptions of iron in proportion." Messrs. Thornycroft & Co. quote their T. P. K. bars £14 10 at the works, less usual discount of 10 per cent, the corresponding figures of other firms, except Earl Dudley, being £14. Messrs. Thornycroft's other prices are now: boiler plates (best 8), £16 10; best best boiler plates, £17 10; treble refined boiler plates, £20 10; ordinary sheets (singles), £16 10; and other kinds in proportion. The fall in sheets has been very irregular. Messrs. E. P. & W. Baldwin, of the Widened Works, near Stourport, announced on Friday night that they had reduced their prices for sheet iron £5 per ton, whilst Messrs. Bradley only reduce £2 10; and the Hope Iron Co. £4. First class singles are to be had at from £19 to £21, but second class sheets of the same kind are being sold at from £13 10 to £14. Second class bars are to be had at £12 to £12 10; hoops, £14; and strips, £15. Galvanized roofing sheets are £23 per ton, with very little doing. Common plain bridge girders are £19 to £19 10, with but few new orders for them. Shipchandlery, hinges, &c., are reduced 2 per cent. off the list of March 12th last. Curry-combs are in poor request, owing to the rivalry of American producers, but it is thought that the fall in sheet iron will tend to promote a more promising state of things, the makers being thereby enabled to pull off 30 to 40 per cent. from previous lists. Pig iron is not in much demand, all mine being £1 lower, or £6 10 to £8 15, the very best brands fetching as much as £8. The Japaners and tin plate workers are doing but a moderate business. American orders for hardware are very small, advices being unfavorable to the future prospects of the Birmingham makers. Before quitting the Birmingham and South Staffordshire districts, to which the foregoing remarks refer, I must call your attention to the following statement, showing the price of bars for the last twenty years:

Year.	£ s. Year.	£ s.
1851.....	6 1869.....	7 0
1852.....	11 0 1870.....	8 0
1853.....	10 0 1871.....	9 0
1854.....	11 0 1872.....	10 0
1855.....	11 0 1873.....	11 0
1856.....	9 0 1874.....	10 0
1857.....	10 0 1875.....	11 0
1858.....	7 10 1876.....	12 0
1859.....	7 0 1877.....	13 0
1860.....	7 0 1878.....	14 0
1861.....	9 10 1879.....	15 0
1862.....	8 10 1880.....	16 0
1863.....	8 10 1881.....	17 0
1864.....	8 10 1882.....	18 0
1865.....	8 10 1883.....	19 0
1866.....	8 10 1884.....	20 0
1867.....	8 10 1885.....	21 0
1868.....	8 10 1886.....	22 0

Until 1872, the official price had not reached £14 since the year 1825. The average price during the last twenty years has been a trifle over £8 per ton; so that present rates are even yet fully £5 to £6 over the average, in reference to which state of affairs the Economist has a comparative statement, which shows the rise in coal and iron since 1871, and iron since 1870. For the first five months of 1871 the average price per ton of coal exported was 9 5, and for the same period of 1873, £1 1 1/4—an advance of 126 per cent. For the first five months of 1871 the average price per ton of iron and steel exported was £7 18 2, and for the same period of 1873 £12 13 5—an advance of 60 per cent. In June, 1870, Glasgow pig iron was quoted 62, while it is now 120—a rise of 58 per cent. In June, 1870, British bars were worth £7 12 6; they are now £12 10—a rise of £4 17 6 per ton.

The discussion on the subject of American

competition in the iron and hardware trades having been initiated by the Times, a number of the smaller fry of journalists have taken the question up. Says the Times: "Not a little interest and some apprehension have been excited in the hardware district, of which Birmingham is the centre, by advices lately to hand from New York respecting the wonderful development of the iron and hardware industries of the United States. The accuracy of these advices is indeed to some extent confirmed by the serious diminution of orders for certain classes of hardware, the manufacturers of which have hitherto found in the American market their principal customers. Nor does it appear that our rivals in the States are content with satisfying the requirements of their own market, for their productions are already supplanting English goods in Canada and, to some extent, in Australia and New Zealand. A correspondent, writing from New York, thus refers to the subject in the Birmingham Post: 'On one point the hardware merchants of New York are all agreed, that the day for the sale of English hardware in the United States has almost departed. In some few special articles, such as pipes, &c., the Germans will probably always be able to undersell all competitors; some English manufacturers of long-established repute, such as Rodgers' cutlery, will also continue to be in demand, but for the rest foreign-made hardware will soon be unknown in this market, unless some unexpected turn of affairs changes for awhile the course of trade. And not only in this country, now competent to supply its own needs, but every year it is gradually increasing the exports of hardware to Canada, to the South American States, and to the British Australasian Colonies. Indeed, it is a common boast that in a very short time the superiority of Yankee skill and ingenuity will force a market in England itself for many articles of American hardware; that Yankee cutlery will appear on English dinner tables, and Yankee saws, augurs, and chisels be preferred by the carpenters of Birmingham and Sheffield.' These statements are to some extent corroborated by the advices now being received by the merchants in Birmingham and Wolverhampton. There can be no doubt that the American manufacturers have turned to profitable account the opportunity afforded by the recent course of events in the English hardware market. For some years the American manufacturers have had to contend with the disadvantage of dear labor; but this very circumstance, by the way, has now proved a benefit to them, seeing that it has enforced the application of labor-saving machinery on a much larger scale than has been attempted in this country. The superiority of American fine iron castings has long been acknowledged, and in the earlier years of hardware manufacture in the States the dearth of labor was largely compensated by the substitution of cast for wrought iron in almost all classes of produce. This advantage was, however, obtained at the expense of the quality of the goods for strength and endurance, and the necessity of increased mechanical appliances for the saving of hand-labor became apparent some years since to the leading manufacturers of the States. The wonderful system of labor-saving machinery now existing is the result. Railway fastenings, door locks, spring bars, curry combs, tin wares, and some descriptions of edge-tools, are among the classes of produce in which American competition is beginning to be seriously felt in Birmingham and the South Staffordshire district. Last year's production of iron mills in the States was nearly 1,000,000 tons, of which Pennsylvania alone yielded nearly one-half. Other descriptions of finished iron are also being produced in large and rapidly increasing quantities, and at the present rate of progress the shipment of iron from England across the Atlantic will soon become a thing of the past." Following this lead, the Birmingham Morning News, a capital condensed paper, discourses in this strain:

"The reduction in the price of finished iron in South Staffordshire, which was announced yesterday, has not been declared a moment too soon. The attempt to prop up a standard of quotations, such as has nominally ruled for the last three months, could only lead to one result; and, as most of our readers are aware, the finished iron manufacturers throughout the district have, as a rule, for some weeks past been unable to keep their mills and forges in operation more than about half time. Last year's masters cherished the idea that iron must be had, and that sooner or later buyers would be compelled to give out orders at the advanced standard. They seemed to forget, however, that buyers were not restricted to South Staffordshire, or even to England, and that many of the orders for which they were fondly waiting might be finding their way to other centres of production. In these days of cheap locomotive power, distance is virtually annihilated, and it is really a fact that Staffordshire goods makers and other large consumers, unable to come to terms with the producers next door, have sent to Belgium for their supplies of raw material, and a few years hence, as matters are now progressing, it will be nothing uncommon for American iron to find its way into South Staffordshire. Already we learn what an important development of the iron trade of the United States is rapidly taking place in this direction. We are of course aware that the trade is now in an exceptional condition, dear fuel and dear labor being for the moment masters of the situation. But if there is no means of reducing the value of coal and manual labor, common sense suggests that the use of them should be economized to the utmost possible extent. Yet nothing in this direction is even attempted in the Black Country. Its stores of fuel are being wantonly and wastefully consumed by imperfect machinery, and labor-saving machinery, which has done such wonders in America, and which promises such wonders in Cleveland, is in this district virtually ignored. There can be no doubt that the iron trade of South Staffordshire is being seriously injured, and the coal 'rig' is not by any means the only source of mischief. The greatest enemies to the iron trade are to be found in the ranks of those who are prejudicially interested in its prosperity. Then among other newspapers in this Sheffield Telegraph remarks at considerable length on the prospect so opened out, and makes these admissions and comparisons:

"In specialties such as the best Sheffield cutlery we may, no doubt, continue to hold our own; but there are several things beside the abundance of their natural supplies of iron which tell in favor of the manufacturers in the United States. The wages earned by the workmen look large when stated in dollars, but when judged by their purchasing power they are probably not so large as those earned by superior workmen in England. And it has been frequently stated, on respectable authority, that in the United States workmen stick to their tasks a good deal more closely than in England. They cannot afford to spend one or two days of the week in drinking or in hand-lapping; nor do they dawdle over their tasks as it has been too much the fashion for some English artisans to dawdle. 'Go ahead' is the watch word in an American workshop; the 'all right,' about which some

very indifferent English workmen are so particularly taken for granted. Another point of great importance has also to be taken into account. There has never been cheap labor in American manufacturing, and employers have thus been saved from a good deal of temptation and embarrassment. They have been saved from the temptation to employ men to do what could easily be done by machines, and from the embarrassment of finding when they got their machines that their employees would not allow them to be put to work. The visitor to an American workshop is in almost every case struck by the skillful adaptation of automatic appliances to the performance of functions which in England, even up to this date, have usually been left to the workmen. This is an advantage which it would be difficult to overestimate; for machines are not only less expensive, but much more easily kept up to their full power of production than is the



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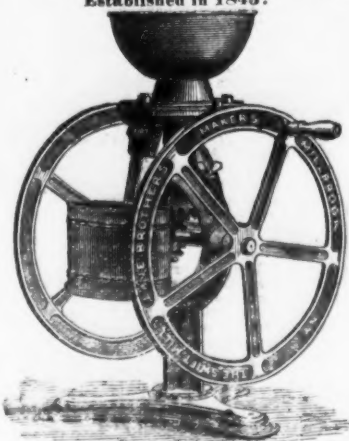
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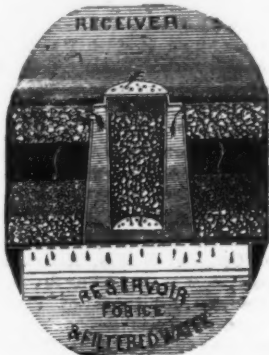
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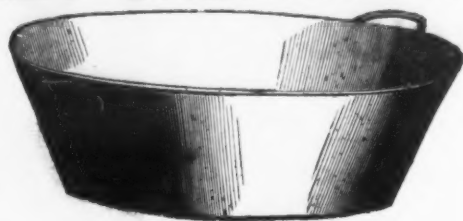
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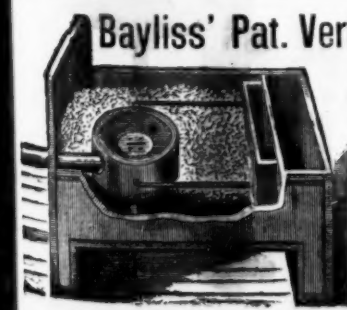
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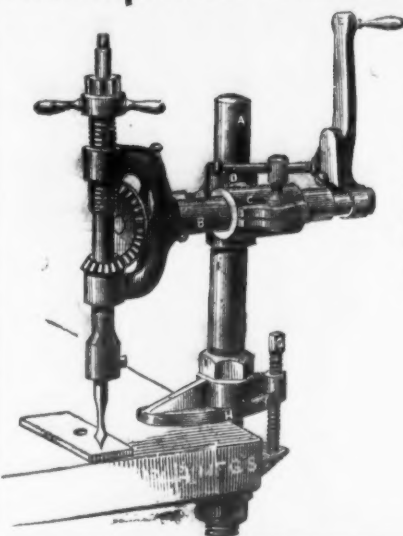
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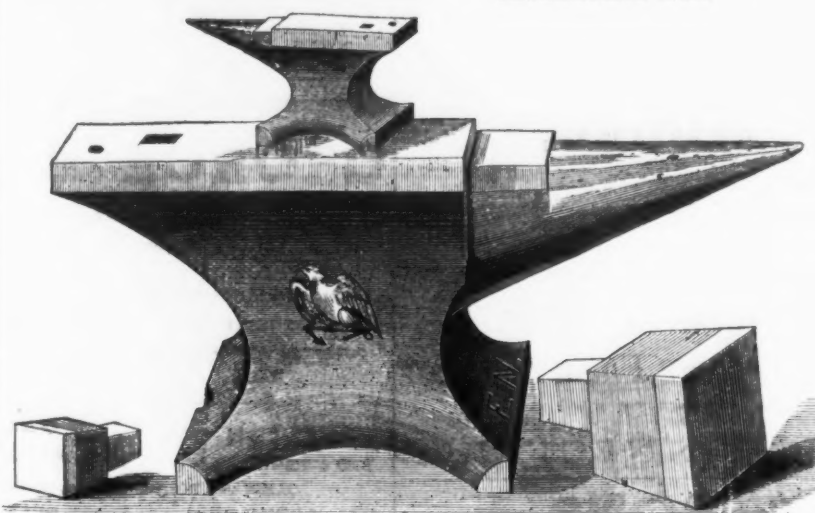
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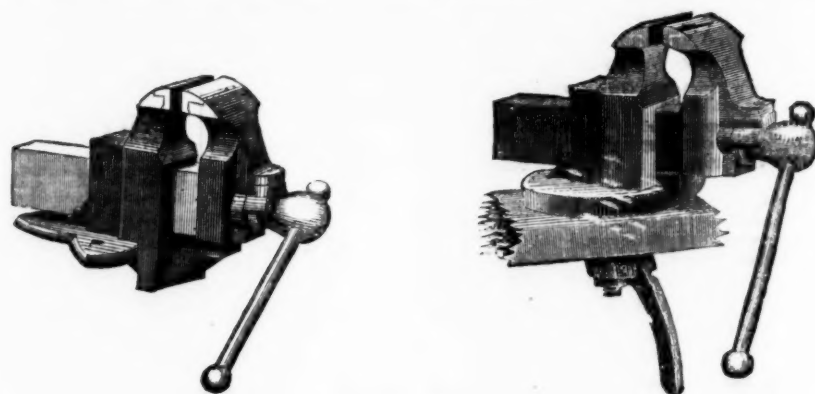
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No. 82 Chambers St., N. Y., Manufacturers of

Our New Patent Improved Self-Tightening Drill Chuck, Victor No. 3.

The cut at the right shows the extra set of jaws which we  
 furnish when ordered, at \$2.00.  
 They can be used for chucking small articles for turning,  
 boring, &c., from 0 to 1 1/2".  
 The jaws can be changed in three minutes.

**The best Chuck in the Market!**

All its parts are of Cast Steel. Warranted to hold  
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Price Extra Jaws . . . . . \$5.00.  
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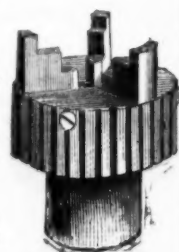
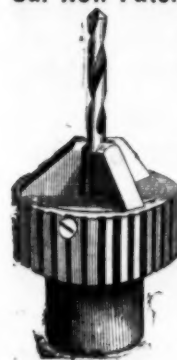
No. 4 Victor Chuck, same principle as No. 3, will hold  
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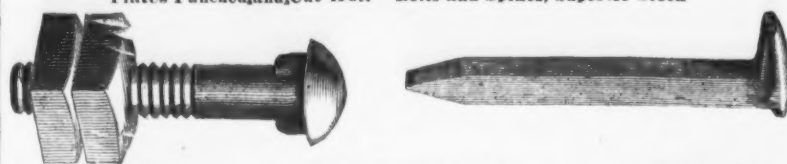
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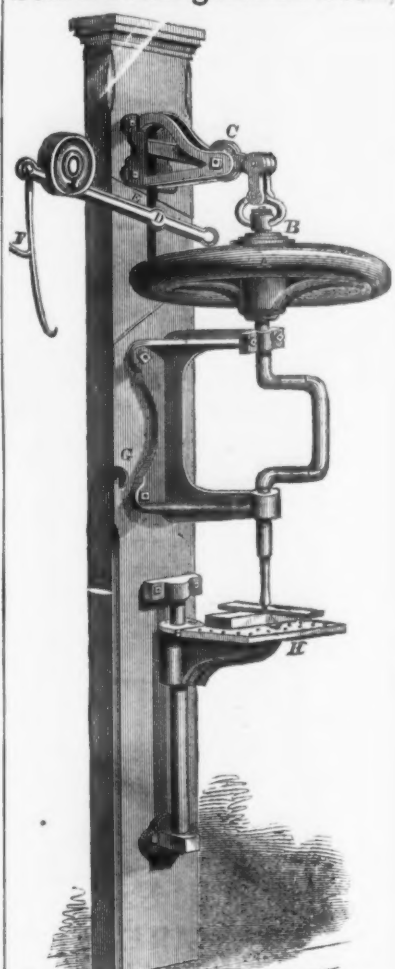
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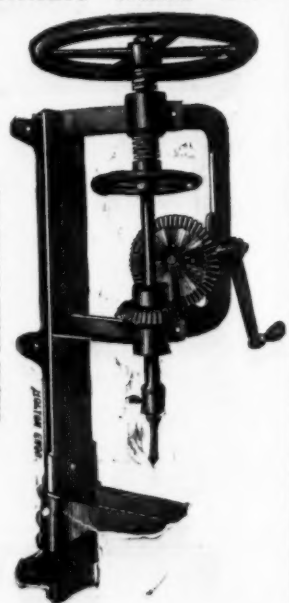
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Candy linen.....	6	@ 6 1/2
" cotton, No. 1.....	7	@ 7 1/2
" " No. 2.....	4	
White linen rags, No. 1.....	7	@ 7 1/2
" " No. 2.....	5	@ 5 1/2
Colored.....	8	@ 8 1/2
Mixed woollens.....	2	@ 2 1/2
Soft woollens.....	4	@ 4 1/2
Gunny bagging.....	1 1/2	@ 1 1/2
Jute Butts.....	3 1/2	@ 3 1/2
Kentucky bagging.....	4 1/2	@ 4 1/2
Book stock.....	4 1/2	@ 4 1/2
Waste paper and scraps.....	3 1/2	@ 3 1/2
Rope cuttings.....	1 1/2	@ 1 1/2
Kentucky Bale rope.....	4	@ 4 1/2
Oakum Junk, No. 1.....	5 1/2	@ 5 1/2
" No. 2.....	4 1/2	@ 4 1/2
Grass rope.....	4 1/2	@ 4 1/2
Tarred Shaking.....	1 1/2	@ 1 1/2
<b>Old Metal.</b>		
Copper.....	27	@ 28
Yellow metal.....	18	@ 18
Brass and Composition.....	18	@ 18
Old lead, solid.....	6 1/2	@ 6 1/2
Tea lead.....	5 1/2	@ 5 1/2
Wrought iron.....	1 1/2	@ 1 1/2
Sheet iron.....	1	@ 1 1/2
Cast iron.....	1	@ 1 1/2
Machinery iron.....	1 1/2	@ 1 1/2
Zinc.....	5 1/2	@ 5 1/2
Pewter, No. 1.....	26	@ 27
" No. 2.....	10	@ 12
Spelter.....	7	

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**Paints.**

Black, lamp—Coach Painters.....	7	@ 20c
" " Ordinary.....	6c	
" Ivory Drop, fair.....	15c	
" " best.....	25c	
Black Paint, in oil.....	kegs, 8c; nest'd cans, 11 c	
Blue, Prussian, fair to best.....	50	@ 75c
" " in oil.....	35	@ 65c
" Chinese, dry.....	35c	
" Ultramarine.....	25	@ 30c
Brown, Spanish.....	35c	
" Van Dyke.....	12	@ 18c
Carmine, 60.....	15	@ 25c
Green, Chrome.....	15	@ 25c
" " in oil.....	30c; best, 40c	
" " in oil.....	30c; best, 40c	
Mineral Paints.....	1 1/2	@ 4c
Orange Mineral.....	14 1/2	@ 14c
Red Lead, American.....	9 1/2	@ 9c
" English.....	10 1/2	@ 10c
" Venetian (N. C.) dry.....	2 1/2	@ 2c
" " in oil.....	nest'd cans, 11c; kegs, 8 1/2c	
" Indian, dry.....	10c	
Rose Pink.....	13c	
Sienna, American, raw.....	4c	
" Burnt.....	4 1/2	@ 4c
" " in oil.....	16	@ 25c
Raw.....	15	@ 25c
Umber, Burnt.....	4	@ 8c
" " in oil.....	16	@ 21c
Raw.....	16	@ 21c
" " in oil.....	16	@ 21c
Vermillion, Chinese.....	1 1/2	@ 1 1/2
" English.....	1 1/2	@ 1 1/2
" Trioste.....	1 1/2	@ 1 1/2
" American, Common.....	23c	
White Lead, American, pure dry.....	11 1/2	@ 11c
" " in oil.....	12	@ 12c
White, Paris, English, prime.....	in bbls. 2 1/2	@ 2 1/2c
Yellow Ochre, French.....	2 1/2	@ 2 1/2c
" " in oil.....	nest'd cans, 11c; kegs, 8 1/2c	
" Vermont.....	in cans 1 1/2	@ 1 1/2c
Chrome.....	17	@ 21c
" " in oil.....	18	@ 25c
Zinc White, American No. 1 dry.....	9c	
" " in oil.....	11	@ 11c
" French (Paris).....	11 1/2	@ 11c
" " in oil.....	12 1/2	@ 12c

**Oils.**

Lined Raw.....	1/2 gal. casks, 97c; bbls, 98c	
" Refined.....	1/2 gal. casks, 100c; bbls, 101c	
Whale, Crude.....	"	
" Refined Winter.....	"	
Sperm, Crude.....	"	
" Winter unbleached.....	"	
" Bleached.....	"	
Seal, Extra Refined.....	57 1/2	@ 57c
Lard, Pure Winter.....	52c	
" Spring.....	52c	
Cotton seed, Crude.....	45c	
" Southern Yellow.....	45c	
White.....	45c	
Nearfoot, Winter.....	41-10 @ 41 1/2	
Natural Lubricating.....	bbls, 45c	

**Sundries.**

Asphaltum.....	9c	
Benzine.....	1/2 gal. tin.....	15c
Chalk.....	"	
" Block.....	"	
Dryer, Patent, Am'n.....	nest'd cans, 11c; kegs, 8c	
" English.....	"	
Flocks.....	20c	
Frostings.....	20c	
Glue, White.....	35c	
" Sheet.....	35c	
Glassers' Points, Zinc.....	35c	
Gum, Copal.....	25c	
" Damar.....	25c	
" Shellac, English.....	25c	
Litharge.....	10c	
Lumice Stone, selected Lump.....	4c	
" powdered.....	4c	
Putty in bladders.....	35c	
" in bulk.....	35c	
Bottom Stone, soft, English.....	35c	
Spirits Turpentine.....	94c	
Whiting, Spanish.....	14c	

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French Windows—1st, 2d, 3d, and 4th qualities. Per box of 50 feet.				
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11 x 14 & 12 x 15.....	11-50	10-25	9-75	8-25
10 x 16 to 14 x 20.....	12-50	11-50	10-25	9-00
18 x 22.....	13-25	12-00	10-75	9-50
15 x 24 to 20 x 30.....	15-75	14-00	12-00	10-25
22 x 30 to 24 x 30.....	19-75	16-75	15-50	14-00
26 x 28 to 24 x 36.....	20-25	17-50	16-00	14-00
26 x 36 to 28 x 44.....	22-75	20-25	18-50	16-00
28 x 44 to 30 x 50.....	24-00	21-50	19-75	17-25
30 x 52 to 30 x 54.....	27-25	24-00	21-50	19-75
31 x 54 to 34 x 56.....	28-50	26-25	23-00	20-00
34 x 56 to 38 x 60.....	31-50	29-25	25-00	22-00
36 x 60 to 42 x 60.....	37-00	32-50	29-50	25-00
<b>DOUBLE.</b>				
SIZES.	I.	II.	III.	IV.
6 x 8 to 10 x 15.....	\$16-00	\$14-00	\$13-50	\$12-50
11 x 14 & 12 x 15.....	17-25	15-50	14-75	13-25
10 x 16 to 14 x 20.....	18-75	17-25	15-50	13-50
18 x 22.....	20-00	18-00	16-25	14-25
15 x 24 to 20 x 30.....	24-00	21-00	18-00	15-25
22 x 30 to 24 x 30.....	29-00	25-25	20-25	17-25
26 x 28 to 24 x 36.....	31-00	26-50	21-00	17-50
26 x 36 to 28 x 44.....	34-00	30-50	22-25	19-25
28 x 44 to 30 x 50.....	36-00	32-25	25-25	21-25
30 x 52 to 30 x 54.....	41-00	36-00	28-25	24-25
31 x 54 to 34 x 56.....	43-00	38-50	30-00	26-00
34 x 56 to 38 x 60.....	49-00	43-00	37-50	32-00
36 x 60 to 42 x 60.....	53-00	47-00	40-00	35-00

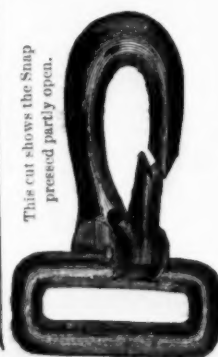
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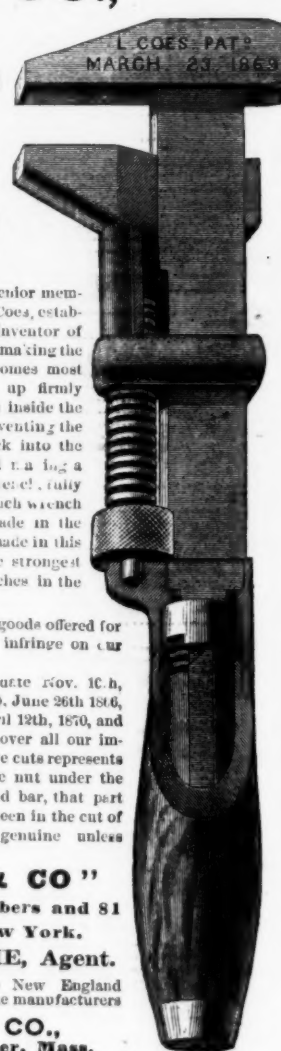
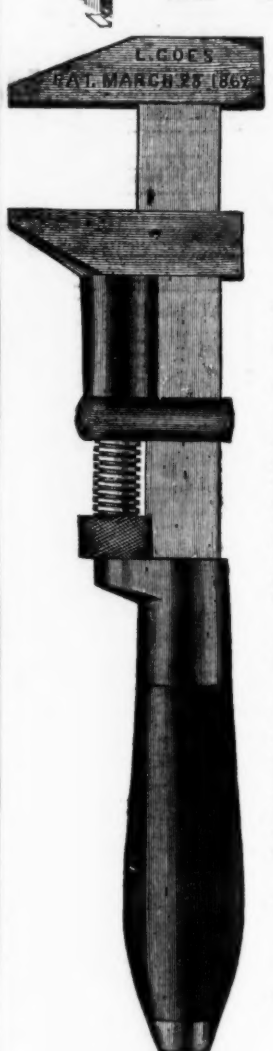
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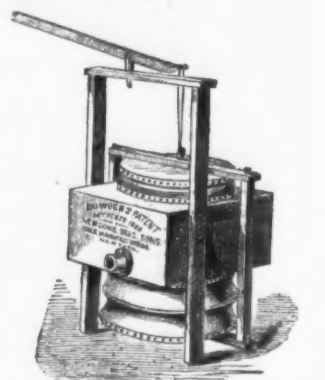
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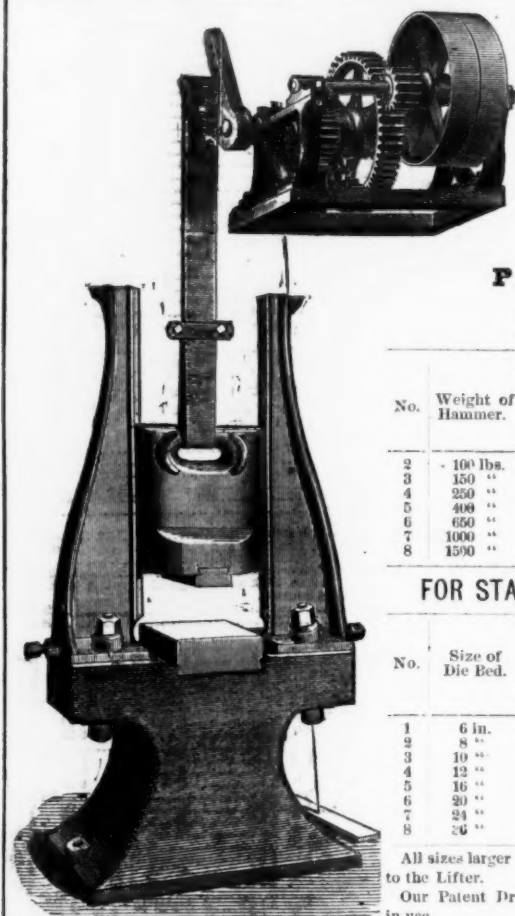


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4	250 "	12 "	30 "	750 00
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6	650 "	16 "	30 "	1300 00
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8	1500 "	16 "	30 "	2500 00

## FOR STAMPING SHEET METALS.

No.	Size of Die Bed.	Weight of Hammer.	Price of Drop without Lifter.	Price of Lifter.
1	6 in.	50 lbs.	\$ 137 50	\$ 82 50
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3	10 "	150 "	300 00	230 00
4	12 "	250 "	400 00	340 00
5	16 "	400 "	550 00	430 00
6	20 "	650 "	750 00	520 00
7	24 "	1000 "	1280 00	620 00
8	30 "	1500 "	1850 00	850 00

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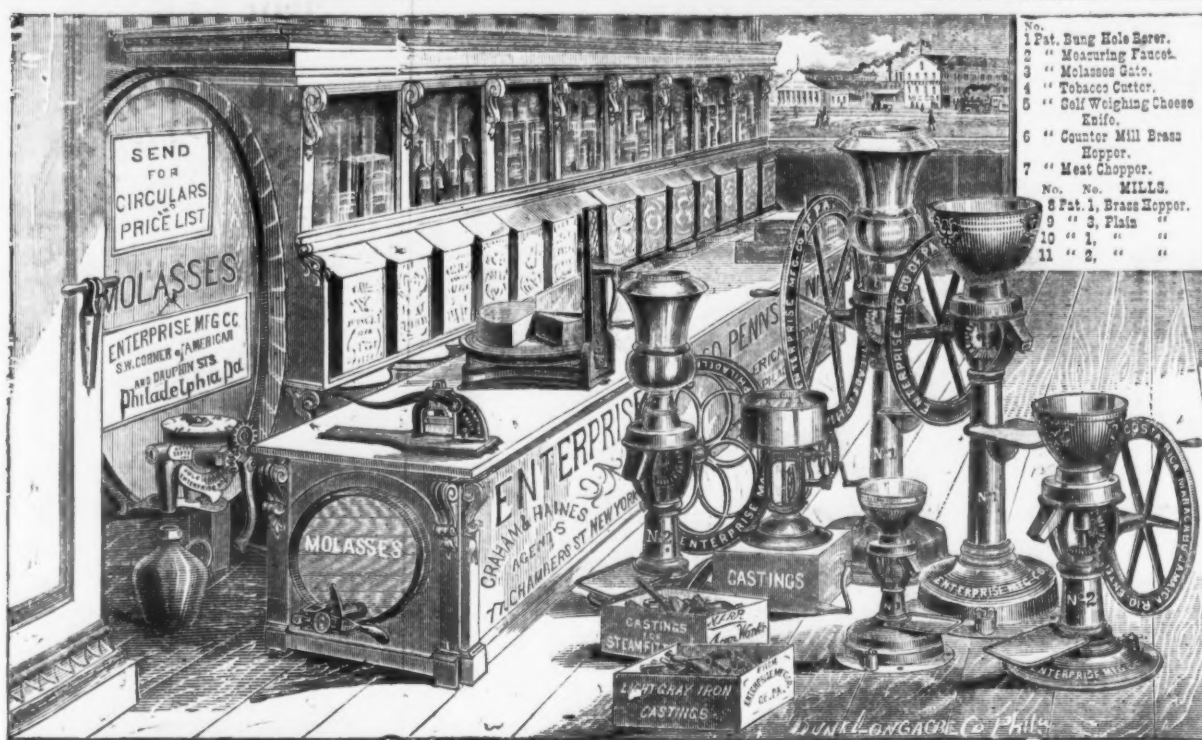
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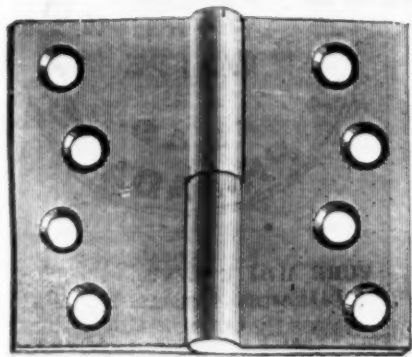
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execute orders for British manufactures on the lowest  
terms, and collect and forward goods for a very mod-  
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fordshire Iron of a standard quality.

Glass.

**A. C. Downing & Comp'y.**

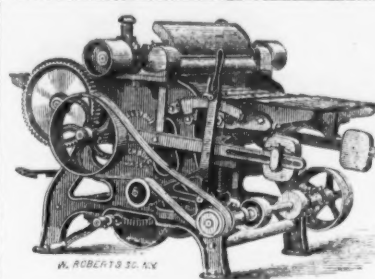
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## Rollstone Machine Works,

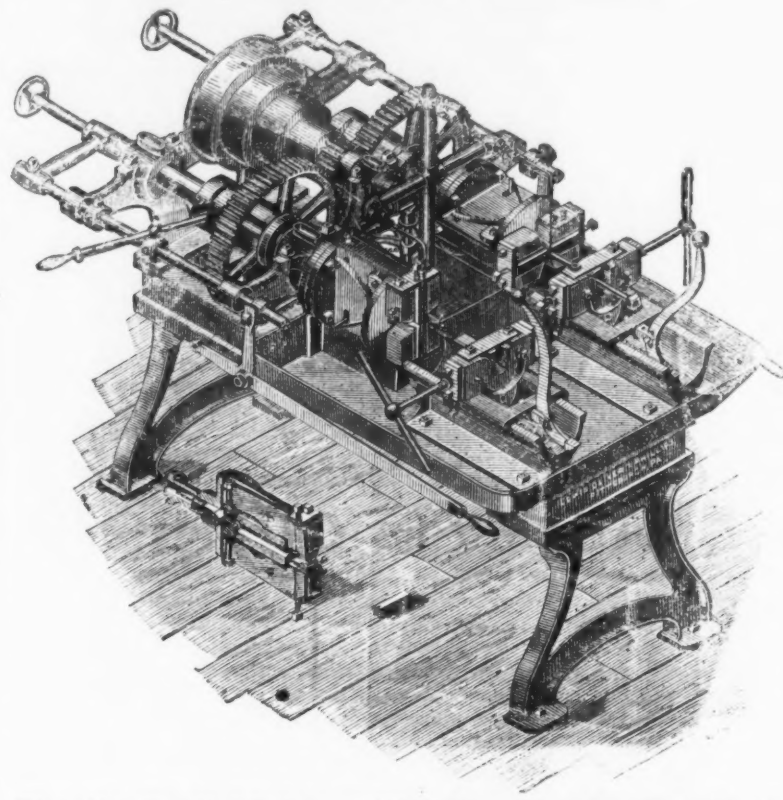
Fitchburg, Mass., Manufacturers of

Rotary Bed Planers, Band Sawing Ma-  
chines, Wardell's Patent Saw Benches, Blind  
Slat Planers, Buzz Planers, Long Plane  
Jointers, Jig Sawing Machines, Flint's Pat-  
ent Saw Mills, Boring Machines, Pattern  
Makers' Lathes, Gauge Lathes, with Kilburn's  
Smoothing Knife Attachment, Wheeler's Patent  
Fan Blowers, Patent Self-Oiling Pulleys,  
Chair Machinery, &c., &c.

E. T. MILES, Pres't. JAS. GOODRICH, Sup't & Treas.

## Lewis' Patent Bolt Machines.

DOUBLE SCREW CUTTER.



This machine will cut two bolts at once, or cut a bolt and tap nut at same time. It cuts either right  
or left from 2000 inch to 4500 1/2 inch bolts in ten hours. The machine is self-oiling, and the dies are self-  
opening. Three sizes are made—the largest cutting from 2 1/4 in., the medium from 1 1/2 in., and the smallest  
from 1/2 in. down.

Send for Photographs and Descriptive Circular of Bolt Header, Screw Cutter, Nut Tapper and Bolt  
Pointer to

**LEWIS, OLIVER & PHILLIPS,**

Merchant Bar, Bundle Iron and Heavy Hardware Manufacturers,  
**PITTSBURGH, PA.**

H. B. NEWHALL, Agent, 11 Warren St., New York.

## The Chapin Improved Bolt Header.

OFFICE OF

**KENNEDY BROTHERS & CO.**

PLAINVILLE, CONN., June, 1873.

To whom it may concern:

We have used for the last three years a Bolt Header manufactured by **The Chapin Ma-  
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run it can easily head 10,000 bolts per day, or 200,000 per month. We have headed on our ma-  
chine in one hour and a quarter 3000 1/2 bolts. We cheerfully recommend the machine to any  
parties in want of such, as they are indispensable for heading bolts.

Yours, very truly,

KENNEDY BROS. & CO.

The above is one of the many Testimonials we are receiving in favor of our Bolt Machinery.  
Circulars, Prices and all further information given by addressing

**The Chapin Machine Co.,**

New Hartford, Conn.

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WHOLESALE

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**HARDWARE FACTORS.**

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Bonney's Pat. Hollow Augers & Spoke Trimmers.

Bonney's Patent Double-Edged Spoke Shave.

Bonney's Patent Adjustable Gate Hinge.

Bonney's Patent Sash-Fast and Lamp Bracket.

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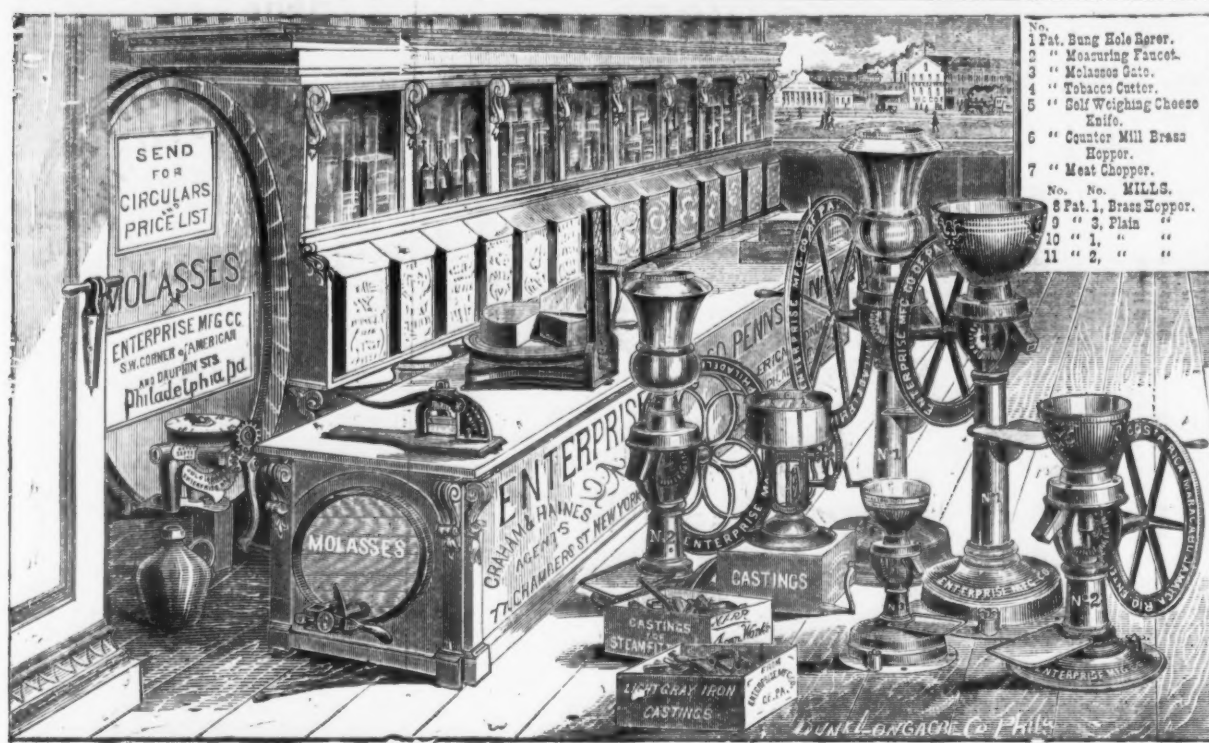
BACK VIEW











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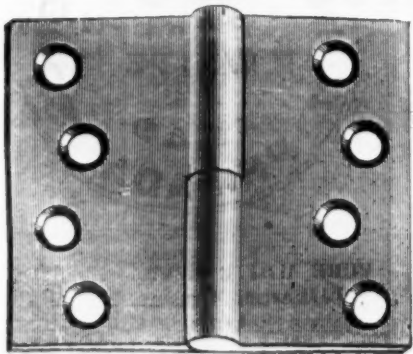
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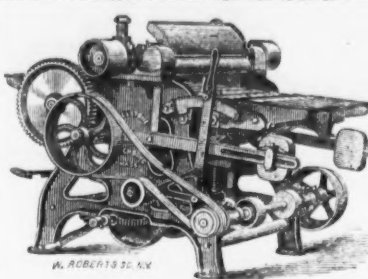
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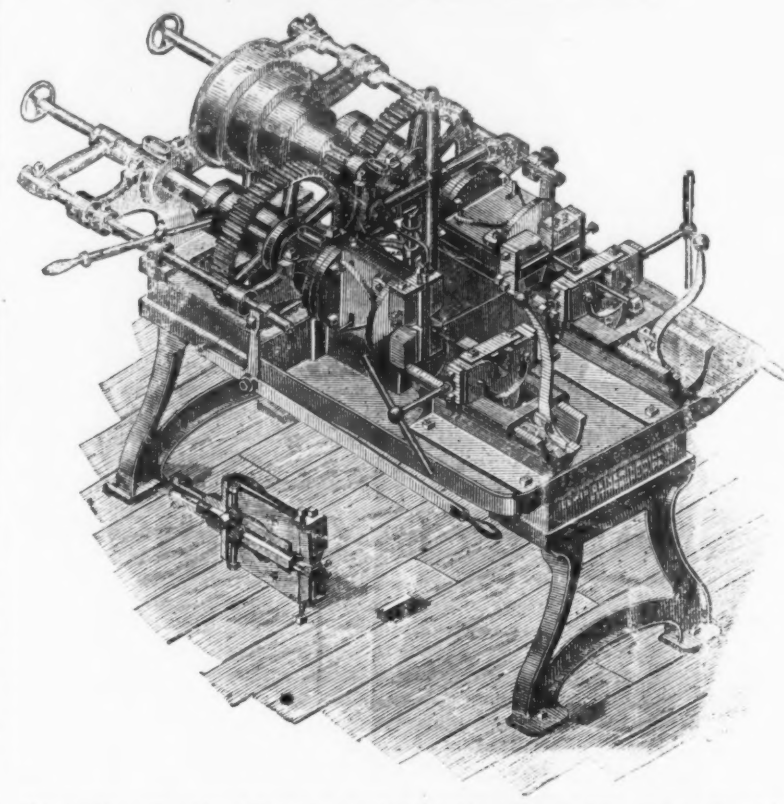
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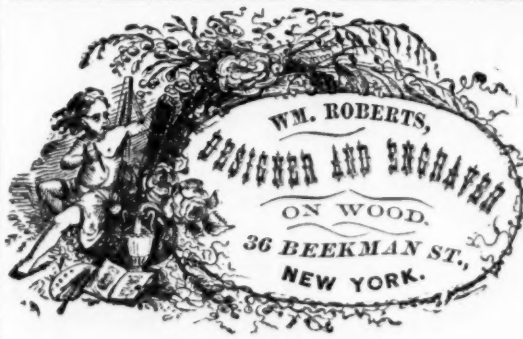
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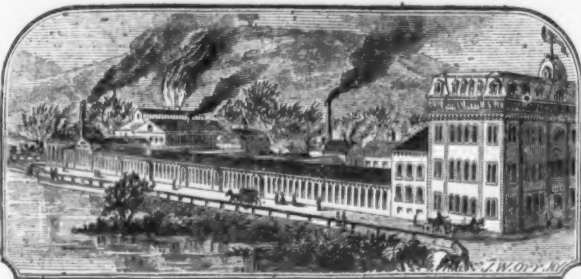


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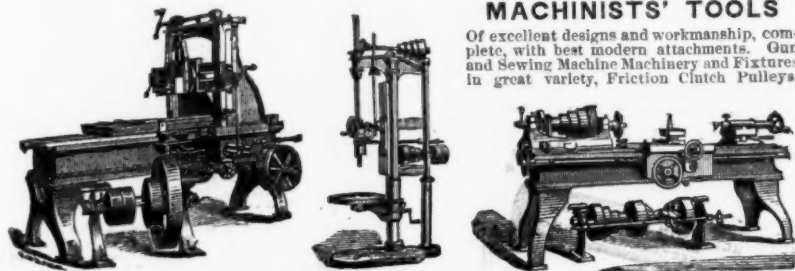
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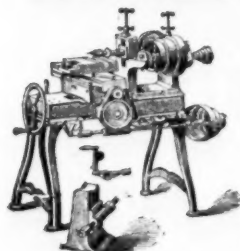
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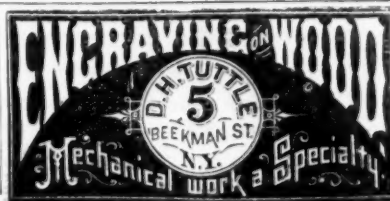
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Machinists' Tools,

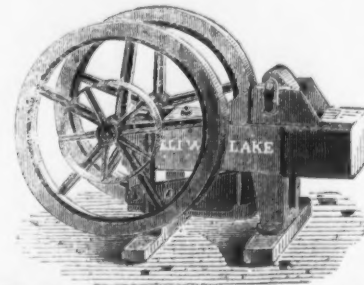
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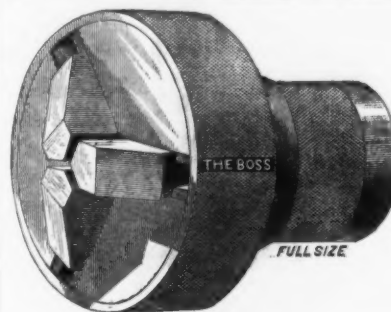
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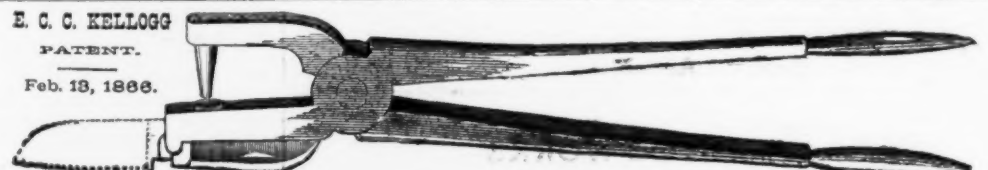
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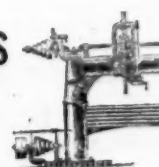
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**A. S. K. Holbrook, Ogdensburg, N. Y.,** writes Nov. 26,  
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**P. P. Mast & Co., Buckeye Agricultural Works,**  
Springfield, Ohio, writes July 29th, 1872.—Our  
Novelty Press works to our entire satisfaction.

**Oscar F. Black, Vergennes, Vt.,** writes Dec. 16th,  
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**F. H. Pinkham, New Market, N. Y.,** writes Aug.  
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work it.

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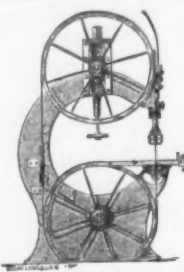
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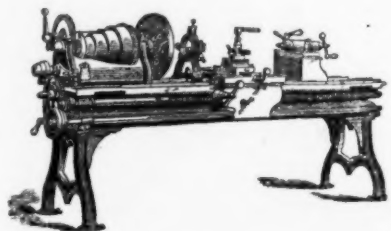
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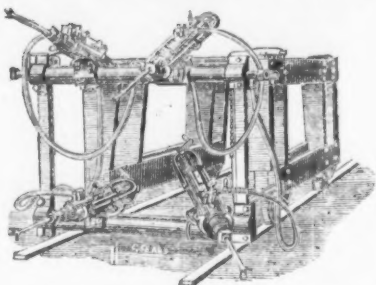
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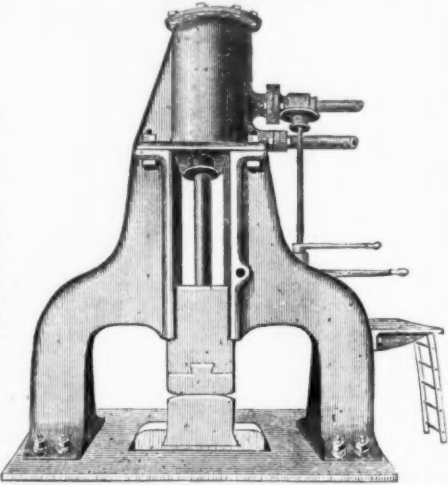
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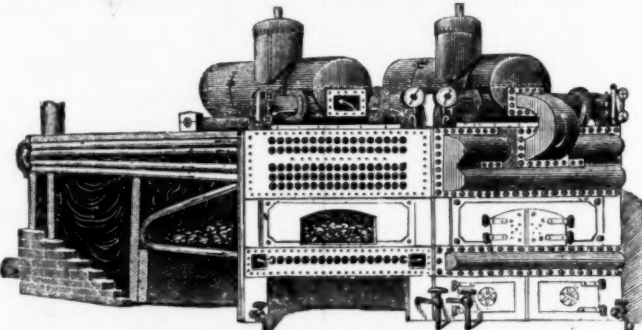
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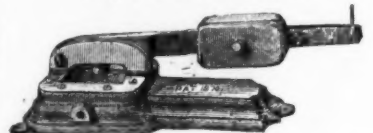
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